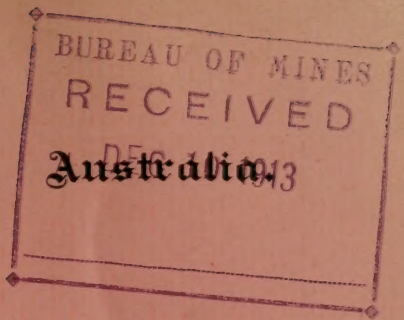


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Engineering

A REVIEW

OF

MINING OPERATIONS

IN THE

STATE OF SOUTH AUSTRALIA

DURING THE

HALF-YEAR ENDED JUNE 30th, 1913.



No. 18.

DO NOT REMOVE
FROM THIS ROOM

Compiled by LIONEL C. E. GEE, S.M., Chief Registrar and Recorder, Department of Mines

ISSUED UNDER THE AUTHORITY OF THE

HONORABLE SIR RICHARD BUTLER, M.P.,
Minister of Mines,

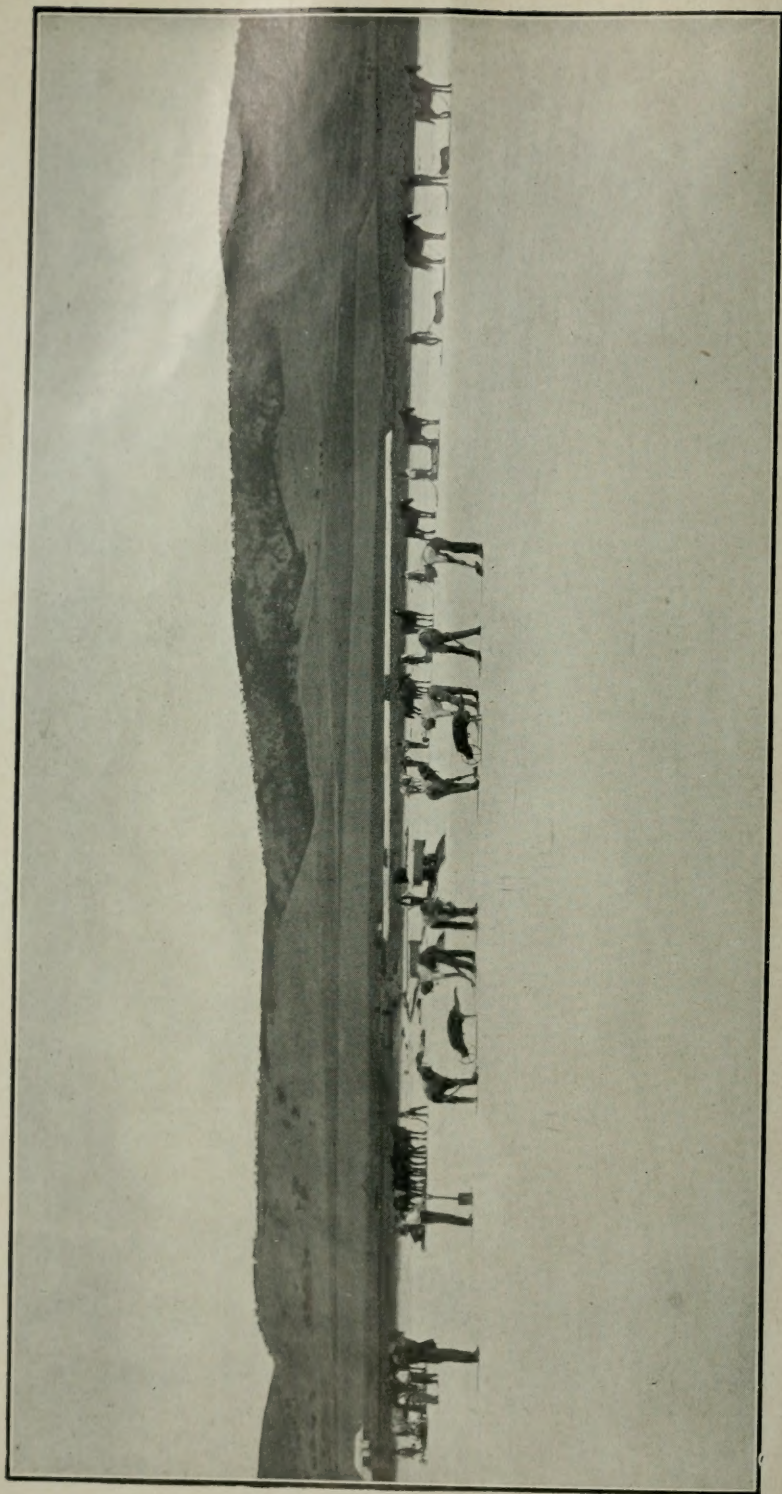
By F. C. WARD, *Secretary for Mines.*

DEPARTMENT OF GEOLOGICAL SCIENCES,
UNIVERSITY OF TORONTO

Adelaide :

R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1913.



AUSTRALIAN SALT COMPANY, LIMITED, LAKE BUMBUNGA.—HARVESTING SALT.

South



Australia.

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OF

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1913.

Miners' Rights and Privileges thereunder.

A miner's right is obtainable at the Department of Mines, Adelaide, also at the issuing stations in the various mining districts, at a cost of 5s.

A miner's right is in force for one year from the date of issue, and may be renewed at any time during its currency for another term of one year on payment of 5s.

The holder of a miner's right is authorised to prospect on any mineral lands for any metal, mineral, coal, or oil, and to peg out (of the prescribed shape and dimensions) gold, mineral, coal, and oil claims, and also leases of a like nature.

AREAS AND WORKING CONDITIONS.

GOLD LEASES—Maximum area, 20 acres; working conditions, one man to every five acres.

MINERAL LEASES—40 acres; one man to every 10 acres.

MISCELLANEOUS LEASES—

Salt	640 acres; special conditions.
Gypsum	640 “ “
Mining Works.....	10 “ one man.
COAL OR OIL LEASES	640 “ one man to every 40 acres.
GOLD DREDGING LEASES	200 “ special conditions.
MINERAL CLAIMS	40 “
GOLD CLAIMS.....	30ft. x 30ft., alluvial; 100ft. x 600ft., reef.

Gold claims must be constantly worked—one man for each claim—and mineral claimholders must employ two men for each claim. Amalgamation of either gold or mineral claims reduces the labor conditions by one-half.

Gold, mineral, coal, and oil leases are granted for a term of 42 years—the two former at a rental of 1s. per acre per annum and a royalty of 6d. in the pound on net profits, the latter at a rental of 6d. per acre per annum until coal or oil is found in payable quantities, when 1s. per acre is payable and a royalty of 6d. in the pound on the net profits.

The Minister may permit, for the concentration of labor, of the amalgamation of not more than four adjoining gold or mineral leases.

Any number of gold, mineral, coal, or oil leases may be held by one person.

Licences to search for twelve months for precious stones, mineral phosphates, oil, rare metals, minerals, and earths are issued on specific mineral lands, not exceeding five square miles in area for one person, a fee of 20s. being charged for each square mile or portion thereof. These licences give a preferential right to a lease over a portion of the area, as prescribed.

PREFACE.

The average standard price of copper, the chief mineral product of the State, has been £67 11s. 3d. per ton for the six months. For the preceding six months the average was £77 5s. 2d., and for the whole of 1912, £73 1s. 3d. The market appears strong, and the quantity of copper produced during the last six months is well above the average of recent half-yearly productions.

Vigorous operations continue on the radio-active ores near Radium Hill, in the Olary district, and good results are now obtained at Mount Painter.

Capital is being introduced for the purpose of thoroughly testing the silver ore deposits near Cowell.

The salt scraping season has been a very satisfactory one.

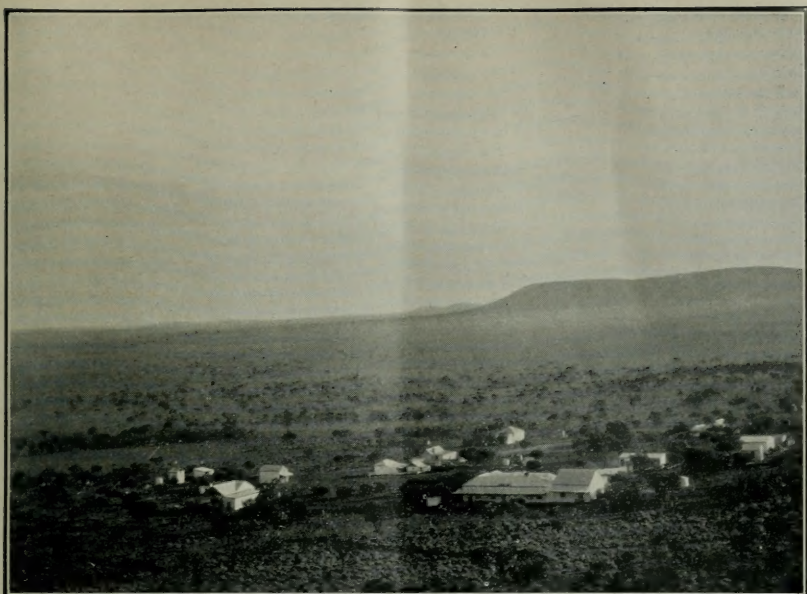
LIONEL C. E. GEE,

Chief Registrar and Recorder, Department of Mines.

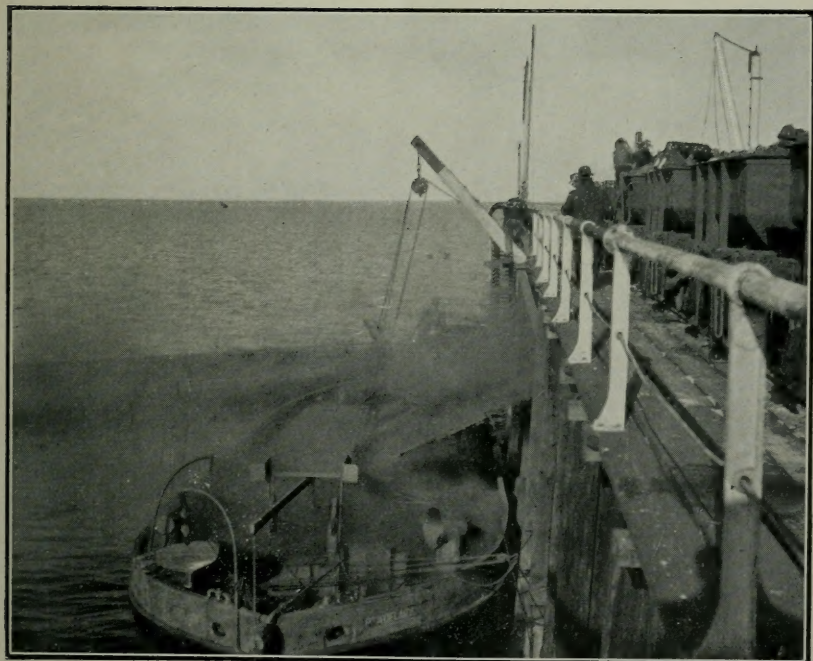
August 21st, 1913.

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IRON KNOB TOWNSHIP FROM IRON KNOB.



LOADING IRON ORE, HUMMOCK HILL JETTY.

To face p. 4.]

Mining Operations during the Half-year ended June 30th, 1913.

AREA AT PRESENT HELD UNDER MINING ACTS (JUNE 30TH, 1913)

Nature of Holding.	Number.	Area.
Mineral leases	257	12,203 acres
Gold leases	82	1,544 "
Gold dredging leases	1	100 "
Miscellaneous leases	56	15,143 "
Mineral claims	380	14,173 "
Occupation licences	202	101 "
Search licences	133	253,080 "
Coal claims	5	3,200 "
Gold claims	5	12 "
Total holdings	1,121	299,556 acres

REGISTERED FROM DECEMBER 31st, 1912, TO JUNE 30TH, 1913.

Mineral claims	91	3,640 acres
Gold leases	9	180 "
Mineral leases	9	262 "
Miscellaneous leases	6	1,346 "
Miners' rights	526	—
Search licences	20	12,800 "
Coal and oil claims	3	1,920 "
Gold claims	—	—
Total	664	20,148 acres

MEN EMPLOYED.

Estimated number of men employed in mining and mineral works, June 30th, 1913 :—

Copper	4,000
Gold	800
Salt	500
Silver-lead	30
Other minerals	450
Smelting works, Port Pirie	1,380
Total	7,160

GENERAL NOTES.

The highest price for standard copper was the quotation of January 7th, viz., £76 15s. per ton; and the lowest, June 24th, £62 17s. 6d. The average for the six months is £67 11s. 3d.; for the six months ended December 31st, 1912, £77 5s. 2d.; for the six months ended June 30th, 1912, £68 17s. 4d.; and for the year 1911, £56 1s. 10d.

The average for the last 18 months is £71 4s. 7d., a very satisfactory price indeed, and the market appears to be firm.

The *Walleroo and Moonta* Company report that operations consist of mining work on various lodes, vein stuff hauled to surface, crushed, sorted, and concentrated by special machinery or treated chemically, the products forwarded to Wallaroo for smelting and refining into copper. At the *Walleroo*, 68,766 tons of ore were broken and 64,044 tons of 3.55 per cent. treated. At *Moonta*, 13,931 tons were broken and 11,902 tons of 2.44 per cent. treated. The prospecting work at *Moonta*, agreed upon in order to test the ground below the 1,200ft. level in the west lode opposite the main ore body at Taylor's, is making satisfactory progress.

The Assistant Government Geologist has begun, by direction of the Hon. Minister of Mines, the work of geologically surveying the *Walleroo and Moonta* mining field.

From the *Hamley Copper Mine* 186½ tons of 18 per cent. concentrates and 84¾ tons of 8 per cent. slimes have been treated (*vide* Inspector's report, page 29).

On account of the reconstruction of the company not much work has been done during the half-year at the *Mount Lyell Consols Wallaroo (Bingo) Mine*.

The miners working at the old *Blinman Mine* have marketed 38 tons of ore, producing 6½ tons of copper. In addition to stoping in the old workings, general prospecting is in progress on the property.

Tumby Bay Mine.—The main shaft had, at the end of the six months, reached a depth of 141ft., and although the sinking was still hard, the prospects for a change were better. The smooth wall on the north end is still going down, with green seams showing alongside. Specks of yellow ore are seen when breaking ground in the shaft

The old *Strathalbyn Copper and Silver-Lead Mine* has been reported on by the Inspector of Mines, *vide* page 33.

The Kanmantoo Mines.—The Secretary, Mr. J. S. Scott, reports—"I have to advise that the company was formed principally to unwater the workings known as the 'Emily Workings.' It was thought that these comprised a shaft with the usual drives and stopes, but as the water was taken out it was found that the workings comprised a huge underhand stope, the chute of ore being followed on the underlie. At a vertical depth of 80ft. the stope was approximately 60ft. long by 25ft. wide. Below 80ft. the workings go down on a flat underlie for about 60ft., being about 10ft. wide by 10ft. high. Around the stope at 80ft. a considerable quantity of copper ore is showing, consisting of a good yellow sulphide. Expert advice stated that it would, if found in sufficient quantities, prove to be a splendid smelting ore. The company was unable to dispose of the lease of the property and, as funds were exhausted, operations were discontinued."

An accidental discovery of copper ore on section No. 116, hundred of Hanson, has led to the formation of the *West Burra Copper Mining Company*. Some rich ore has been unearthed, and a favorable report on the venture by Inspector Jones will be found on page 35.

Some prospecting for copper is being done near *Castambul*, in the hundred of Onkaparinga. Assays have ranged from 3 per cent. to 20 per cent.

At *Mount Gunson*, general surface and exploratory work is in hand, also assaying and leaching experiments are in progress preparatory to the erection of plants for the treatment of the copper ore.

The Union Consolidated Copper Mines, Yudnamutana.—Men are employed in raising ore for smelting. A large supply of coke has been ordered, and it is stated that smelting will be commenced as soon as a month's supply has been conveyed from Farina to the mines.

The well-known *Kapunda Mine* is now under offer in England. For comprehensive reports on this valuable property see "Record of Mines," page 66.

At the *Montacute* the sinking of the main shaft has continued with a crosscut E of 10ft. ; also the sinking of two prospecting shafts and cross-cutting and driving to pick up lodes and leads of alluvial.

From the claims near *Leigh Creek, Paull's Mine* and claims adjoining, *Diamond Jubilee, Nichol's Nob, Clara St. Dora, Warra Warra, Black Eagle, Beltana Rapid Ore Syndicate*, and other claims in the north, small quantities of copper ore are being raised.

Notes regarding *Tarcoola* and *Glenloth*, and details of ore treated will be found on page 13.

The *Western Exploration Syndicate* had 11 tons of stone from the claim near *Lake Labyrinth* treated at *Tarcoola* for a return of 20ozs. 14dwts. 12grs. of gold, valued £78 4s., or 142s. per ton. The funds of the syndicate were exhausted, but a Government subsidy has been granted to aid in continuing operations.

Deloraine Gold Mine.—Reports show No. 3 shaft sunk from 168ft. to 192ft., drive S. 50ft., N. 16ft.; the reef here varies from 18in. to 48in. in width and carries a value of 65s. per ton. Drive S. from the 100ft. level extended 18ft. from 172ft. to 190ft. The reef is mostly small at the end, but at 150ft. to 175ft. opened up to 26in. wide, assaying 66s. per ton. No. 1 winze has been started on this level 65ft. from the shaft and sunk 19ft.; reef 24in., valued at 71s. per ton.

During the six months ended June 30th, 900 tons of ore were treated, producing 588·4ozs. and 569ozs. copper, the total value being £1,911.

The following statement of production to April 30th is interesting:—

STATEMENT OF METAL PRODUCTION TO APRIL 30TH, 1913.

No. of Parcel.	Net dry Weight.	Raised from.	Treated at.	Value of Gold Recovered.	Value of Copper Recovered.	Total Gross Value Recovered.
	Tons.			£ s. d.	£ s. d.	£ s. d.
1	60·60	No. 1 Shaft	Mt. Torrens	334 10 6	—	334 10 6
2	78	No. 3 "	"	569 19 7	—	569 19 7
3	4·80	No. 3 "	Electrolytic Works, N.S.W.	91 11 7	38 14 1	130 5 8
4	93 25	No. 3 "	"	418 2 8	20 10 0	438 12 8
5	124·65	No. 1 "	Mt. Torrens	269 18 10	—	269 18 10
6	5·00	No. 6 "	"	8 12 1	—	8 12 1
7	31·29	No. 3 "	Electrolytic Works, N.S.W.	109 10 6	1 0 7	110 11 1
8	17·75	No. 1 "	Mt. Torrens	203 15 2	—	203 15 2
9	54·39	No. 3 "	Electrolytic Works, N.S.W.	287 4 1	18 5 6	305 9 7
10	4·60	No. 3 Shaft	Mt. Torrens	17 5 8	—	17 5 8
11	5·50	"	"	14 7 6	—	14 7 6
12	28·20	"	"	81 7 9	—	81 7 9
13	100·00	"	"	200 7 9	—	200 7 9
14	28·55	"	"	73 17 2	—	73 17 2
15	10·90	No. 7 Shaft	"	99 2 8	—	99 2 8
16	8·93	Concentrates from parcels 10/13	Electrolytic Works, N.S.W.	84 13 5	20 0 9	104 14 2
	479	No. 3 & 7 Workings Concentrates	Mine Battery	908 1 8	—	908 1 8
	4·07	"	Electrolytic Works, N.S.W.	109 6 4	13 1 10	122 8 2
	882	—	Mine Battery	1,709 4 8	—	1,709 4 8
	32·02	Concentrates	Electrolytic Works, N.S.W.	423 19 11	88 9 10	512 9 9
	2,053·50			£6,014 19 6	£200 2 7	£6,215 2 1

The secretary of the *Woodside Mines* (Mr. A. H. Scarfe) reports—"The efforts of this company to secure the re-opening of these mines by the introduction of a substantial working capital having proved fruitless, the whole of the freehold, with the machinery and buildings thereon, has been sold and the machinery and plant dismantled."



AUSTRALIAN SALT COMPANY, LIMITED, LAKE BUMBUNGA.—STACKING SALT.

This is much to be regretted, as a large company formed to work the Bird-in-Hand and adjoining mines would have every reasonable prospect of success.

No work except the cyanidation of tailings, from which good results were obtained, has been done since 1897, when the Bird-in-Hand Mine was unwatered by Mr. Shallcross, and was then examined by Mr. Joel Phillips, formerly manager of the Broken Hill Junction, down to the 350ft. level. He found the lode to be from 8ft. to 12ft. wide, and his sampling averaged 16dwts. per ton. His report generally was very favorable, and he states that there is a long stretch of auriferous country which, if properly opened up, would give excellent returns. The last crushings of the original company (Captain J. Warren, manager) in 1889 were from the bottom levels, and 4,170 tons of stone yielded 2,776ozs. of smelted gold, or 13dwts. 7½grs. per ton. In 1897, 10,605 tons of tailings were cyanided and gave 1,242ozs. of fine gold. The mines are only a short distance from the railway, there is abundance of fresh water for cyanide treatment, and wood is plentiful in the district. Historical details of these mines will be found in the "Record of Mines," page 326.

The *Balhannah Mine* in the same district is also, so far, unable to obtain capital for re-opening. It contains copper, gold, silver, and bismuth, and has not been worked since 1876. Interesting and most encouraging official reports on this property are given in the "Record of Mines," page 23.

The tributers at *Kitticoola* have had 215 tons crushed by their battery for 64ozs. 1dwt., valued at £208 7s. 2d., or 19s. per ton. Stopping above and below the 180ft. level is in progress.

Since gold prospecting has been done in the hundred of Hardy, at a claim named *Only a Dream*, 4½ tons of stone treated at Petersburg gave 2ozs. 1dwt. 19grs. of gold, valued at £7 0s. 8d. Vide report, page 40.

Mining on the *Ironclad* and *Scotchman* reefs at *Teetulpa* has been resumed. See report on page 45.

Medora and Mount Grainger.—The mine plant has treated 260 tons for 59ozs. 6dwts. 20grs., worth £148 10s. The mining work done consists of cutting down Jones's underlie shaft and laying tramway to bottom, stoping ore at 120ft. and 220ft. levels, and surface prospecting along line of lode.

A geological survey of the Mount Grainger district has been made by Mr. R. Lockhart Jack, Assistant Government Geologist, and Report No. 2, in which it is embodied, will be issued at the same time as this Review.

Returns from the *Ajax Mine*, near Waukaringa, worked by the Babylonian Company, show 900 tons treated for 540ozs., worth £1,996 15s., or 44½s. per ton.

A report by the Assistant Government Geologist on the *Kirkeek's Treasure Mine*, Nillinghoo, will be found on pages 24—27. An effort is now being made to secure the water supply, for lack of which alone the development of this property has been delayed.

Wadnaminga. The first returns from stone crushed by the five-head battery recently erected by Mr. O. W. Allanson on the *Virginia Mine* are given on page 15. The tailings have yet to be treated, and a cyanide plant consisting of six 15-ton vats is in course of construction; also arrangements are in hand for the installation of a compressor plant to facilitate the sinking of the new main shaft to 200ft.

Golden Record. The owner has recently dollied about 30ozs. of gold from a few tons of stone.

New Milo.—A new shaft has been started at the E. end of the lease, disclosing a lode 30in. wide. No assays have been made, but the stone dollies well. Reports by Inspector of Mines, page 42.

Robertstown Bright Silver-Lead Mine.—Thirty tons of ore have been raised, value estimated at £450. General prospecting is in progress, also the sinking of a shaft, which is now 188ft. deep.

Two syndicates have been formed in Melbourne for the working of the silver finds in the *Hundred of Miltalie*, near *Cowell*. So far not much work has been done on the properties, but systematic prospecting and development are being taken in hand. For detail reports on holdings in this locality *vide* pages 29—32.

Mount Malvern Silver-Lead Mine, hundred of Noarlunga.—Three hundred tons have been raised, and 40 tons marketed, containing 56 per cent. to 60 per cent. lead and 13ozs. to 16ozs. silver per ton. *Vide* Inspector's report, page 36.

From *Ediacara* in the North and *The Perseverance* (Winkler's) in the North-east small quantities of silver-lead ore have been mined.

Returns show only 2cwts. of *wolfram* obtained.

The Broken Hill Proprietary Company has already set in hand the preparations for the treatment of the iron ore from *Iron Knob*. The smelting works are being erected at Newcastle, N.S.W., and it is expected that the work of production will commence early in the year 1915.

The Adelaide Cement Company has been formed to work the clay and limestone deposits at Muloowurtie and Dalrymple on Yorke Peninsula.



IRON KNOB FROM IRON MONARCH.



EASTERN SIDE OF IRON MONARCH FROM IRON KNOB.

To face p. 10.]

The Secretary (Mr. J. K. Samuel) has supplied the following notes regarding the operations of the *Radium Extraction Company of South Australia, Limited, Mount Painter*.—

On the strength of the Government Geologist's opinion that the development work done by the company in the past had been of negative value, the company decided to spend the remainder of the funds which it had in hand in further development work, and Mr. H. G. Stokes, F.G.S., was appointed to take charge of the operations. Work was resumed in February last on the lines recommended in Mr. Ward's report, and the results obtained within a few months showed that the anticipations contained in that report were well grounded. The company has restricted its operations to the vicinity of the No. 6 workings, and the results of the recent prospecting have induced the shareholders to subscribe further capital to continue the work of prospecting and development. Some general prospecting has been done, and the shoot of ore at which the discoveries of rich autunite and torbernite were formerly made has been followed for some distance at two levels, 36ft. and 50ft. respectively, below the outcrop. This latter work has resulted in the discoveries that—

- (1) The shoot of ore on which the shaft was originally sunk has a considerable lateral extent—both in easterly and south-easterly directions.
- (2) That the extent of the ore shoot is greater in the underground workings than the outcrop indicates.
- (3) That the rich ore occurs in a brecciated zone which extends beyond the limits of existing excavations.

The importance of these ascertained facts of occurrence in a region in which the factors governing the distribution of ore are not readily apparent on the surface can hardly be overestimated. It is possible that the principles controlling the deposition of the high grade ore at the No. 6 workings will be found to be applicable beyond the limits of these workings, and that other discoveries of payable ore may thus be made in the neighborhood.

Twenty-five tons of ore, assay value 2.6 % U_3O_8 , have been sent to England, and arrangements made for a further shipment of 100 tons of similar value.

The Radium Hill Company.—Vigorous operations are in progress at the mine near Olary, and regular supplies of concentrates are forwarded to the works, near Sydney.

The Managing Director, Mr. T. D. Jones, left for England and the Continent in April in order to make the arrangements necessary for marketing the radium preparations produced by the company.

Recent communications from Mr. Jones show that he submitted samples to Professor Rutherford, which were carefully examined by Dr. A. S. Russell, of the Physical Laboratories, Manchester University, who reports—"I find that the only radio-active bodies it contains are radium and its disintegration products. The preparation is free from meso-thorium and other radio-active substances which, without a careful examination being made, are likely to be mistaken for radium."

Professor Rutherford, in commenting on the latter portion of this report, says—"This is an important point in connection with the sale of your product since, as you know, it is very difficult to distinguish between preparations of radium and the cheaper product, meso-thorium."

The directors, feeling confident that all preliminary difficulties in connection with the extraction of radium from the ores have been overcome and that the extraction will now proceed automatically, propose to enlarge the company, to, on the advice of Professor Rutherford, establish a Radium Bank prior to marketing its products (i.e., a stock of radium bromide from 500 to 1,000 milligrammes), and to sink a further depth of 200ft. at the mine, with a view of obtaining richer ore.

South Australian Radium Proprietary, near Radium Hill, Olary.—The workings have reached a depth where machinery is required, and it is the intention of the company to equip the mine with a concentrator and driving power. Prospects for titanium ore are excellent, the ore so far does not contain a payable quantity of radio-active material, but this is anticipated when greater depth is reached; meanwhile, the titanium ore will be operated on. Further samples are being forwarded to England and Germany (Inspector of Mines' Report, page 41).

Rare Metals Company, near Radium Hill.—The claims have been further prospected and some more ore sent to Germany. A company has been formed to work the property (Inspector's Report, page 41).

Attention is again being called to the *Brown Coal* deposits of the State, and holdings have been taken out in the hundreds of *Krichauff*, *Bower*, and *Brownlow* on the Murray Flats, and in the hundred of *Sherlock*, near Moorlands, on the Pinnaroo railway. Brown coal is now being put to economic uses in Europe and America, and, irrespective of other values, in view of the present high prices of house coal and firewood, it may be hoped that the attempt to utilise the large deposits known to exist in this country will culminate as a matter of great public benefit.

The School of Mines assay returns show that a coarsely crushed sample from near Boolcoomatta gave 1dwt. *platinum* per ton; a sample, also from Boolcoomatta, consisting of magnetite and quartz, gave a trace of *tin*, 0.1 per cent.; and a sample from the hundred of Yankalilla proved to be *alunite* (hydrous sulphate of alumina and potash). The Government Geologist has supplied the following notes:—

Platinum in the North-east.

The discovery of traces of platinum in the north-eastern portion of the State is worthy of notice. Details with regard to the occurrence are not available, but it has been definitely ascertained that platinum, sometimes in association with copper ores, has been found at several points in the Broken Hill region. Dr. Mawson has made mention of the close association of these occurrences with the dark-colored igneous rocks in the Broken Hill region, and has recorded the presence of such rocks within the limits of South Australia. Any prospecting that may be carried out in South Australian territory in the vicinity of these basic igneous rocks should include a search for platiniferous lode matter.

Alunite.

The discovery of the mineral *alunite* for the first time in South Australia is of more than scientific interest. This mineral has for many years been worked in New South Wales as a source of alum. Recently attention has been drawn towards this mineral in other parts of the world with a view to its possible utilisation as a source of potash salts for fertilisers. Should the recently discovered mineral occur in appreciable quantities it should be borne in mind that a demand may arise for this latter purpose.

About the average amount of *phosphate rock* has been marketed from the Kapunda district.

Salt.—The total results of the scraping season 1912-13 may be roughly estimated at 65,000 tons.

COPPER.

AVERAGE MONTHLY PRICE OF COPPER, JANUARY TO JUNE, 1913.

	Standard.			Best Selected.		
	£	s.	d.	£	s.	d.
January	71	18	6	78	1	8
February	65	12	5	71	16	3
March.. ..	65	8	9	70	16	3
April	68	4	10	74	5	0
May	68	18	9	75	0	7
June	65	4	6	71	3	9
Average for the six months	67	11	3	73	10	7

RANGE OF PRICES—

January 7th	76	15	0
June 24th	62	17	6

AVERAGE PRICE OF STANDARD COPPER FOR THE LAST TEN YEARS.

	£	s.	d.		£	s.	d.
1903	58	3	2	1908	60	0	10
1904	59	0	7	1909	58	17	2
1905	64	16	10	1910	57	3	3
1906	87	8	10	1911	56	1	10
1907	82	1	11	1912	73	1	3

Average for the 10 years, £65 13s. 7d.

CRUSHING AND CYANIDING PLANTS.

RETURNS FROM GOVERNMENT CRUSHING AND CYANIDING PLANTS FOR THE HALF-YEAR ENDED JUNE 30th, 1913.

The following is a summary of the work done on State batteries and cyanide works in South Australia during the year ended June 30th, 1913 :—Forty-six parcels of ore have been received for treatment, totalling 1,883 tons 14cwts., which produced 1,519ozs. 5dwts. 12grs. of gold valued at £4,965 9s. 4d. Of this amount £3,923 19s. 1d. has been returned to the prospector as proceeds on the treatment of the various parcels of ore. In addition 1,168 tons of tailings and slimes have been treated by the cyanide process, and 490 assays and pan tests of small parcels and of ore under treatment have been made. The total value of gold produced by the State batteries and cyanide works to date is £65,175 3s. 8d.

At Tarcoola Messrs. Trewartha & Cray continue to get payable results from their low-grade property at the Day Dawn Mine. Messrs. Walsh & Brophy have just completed a new main shaft at the Tarcoola Perseverance. The sinking of this has somewhat retarded breaking operations, but they are now again raising ore. With the exception of the men on tribute at the Government mine, practically all the work being done at Tarcoola is confined to what is commonly called the "Blocks Hill," and no doubt there is plenty of room there for new and rich discoveries, more especially when one recognises that Walsh and Brophy struck their rich find, from which they recovered over £6,000 worth of gold within a few feet of a shaft sunk in boom time and abandoned.

At Glenloth Mr. Condell is prospecting for a Victorian syndicate. Some samples of quartz he submitted to me when at Glenloth last month gave results up to 2ozs. per ton. This new discovery is, I understand, about 9in. wide where exposed,

and situated about three miles from the Glenloth Well. The company is also raising ore from Fabian's No. 3 for treatment at the Government battery.

E. L. GRUNDY, General Manager State Batteries and Cyanide Works.

Name of Mine.	Locality.	Weight of Ore.	Gold Bullion Recovered.	Value of Bullion.	Yield per Ton, in Shillings.
		Tons cwts. qrs.	Ozs. dwts. grs.	£ s. d.	s.

TARCOOLA BATTERY AND CYANIDE WORKS.

Day Dawn	Tarcoola	25 0 0	8 16 13	26 10 4	21/-
Tarcoola Blocks	"	4 10 0	10 16 22	34 4 4	152/-
Eclipse	"	25 0 0	20 0 0	70 0 0	56/-
Morning Star	"	28 0 6	26 17 3	100 5 0	71½/-
Day Dawn	"	75 0 0	86 9 3	293 4 9	78/-
Western Exploration Syndicate	"	11 0 0	20 14 12	78 4 0	142/-
Tarcoola Perseverance	"	56 0 0	50 7 13	172 16 2	61¾/-
"	"	50 0 0	22 17 9	77 10 10	31/-
Tarcoola Blocks	"	28 0 0	13 15 13	49 18 9	35¾/-
Day Dawn	"	10 10 0	3 8 10	10 5 3	19½/-
Total.....		313 0 0	264 3 2	912 19 5	58/-
Grand total since starting of battery ..		4,114 5 0	5,745 14 23	20,252 19 10	98½/-

GLENLOTH BATTERY AND CYANIDE WORKS.

Fabians No. 3	Glenloth	31 0 0	16 7 7	55 11 9	36/-
Options Co. and Ors ..	"	170 0 0	38 11 17	122 10 2	14/-
do.	"	200 0 0	58 16 20	181 13 5	18/-
Total		401 0 0	113 15 20	359 15 4	18/-
Grand total since starting of battery ..		2,233 10 0	2,050 1 8	6,857 17 7	61/-

MOUNT TORRENS BATTERY AND CYANIDE WORKS.

Mount Torrens.....	Mount Torrens....	50 0 0	6 5 2	22 15 0	9/-
Mount Torrens.....	"	124 0 0	4 14 19	18 19 2	3/-
	*Tailings		only.		
Total.....		174 0 0	10 19 21	41 14 2	4¾/-
Grand total since starting of battery ..		10,244 11 3	5,891 1 7	22,315 12 5	43½/-

PETERSBURG BATTERY AND CYANIDE WORKS.

Dustholes	Oodla Wirra.....	9 2 0	5 17 3	21 13 3	47½/-
Only a Dream	Parnaroo	2 10 9	1 2 11	3 15 6	30/-
"	"	2 0 0	0 19 8	3 4 9	32/-
Mines*	Petersburg	62 0 0	2 6 12	9 6 0	3/-
Lehman's Hope	Wilmington	1 13 0	0 3 16	0 12 10	—
Wanda (Homeward Bound)	Mannahill.....	3 11 0	7 5 8	27 19 11	157½/-
* (Sands only) Total.....		80 16 0	17 14 10	66 12 3	16½/-
Grand total since starting of battery ..		4,631 3 0	4,225 18 7	15,748 14 10	68/-



GLENLOTH GOVERNMENT BATTERY AND CYANIDE PLANT.



TARCOOLA GOVERNMENT BATTERY AND CYANIDE PLANT.

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RETURNS FROM CRUSHING AND CYANIDING PLANTS (OTHER THAN GOVERNMENT) FOR THE HALF-YEAR ENDED JUNE 30TH, 1913.

Name.	Ore Treated.			Gold Bullion Recovered.			Value.			Yield per Ton, in Shillings.
	Tons	cwts.	qrs.	Ozs.	dwt.	grs.	£	s.	d.	s.
KITTICOOA, REEDY CREEK.										
Battery treatment	215	0	0	64	1	0	208	7	2	—
Total	215	0	0	64	1	0	208	7	2	19

AJAX (BABYLONIAN G.M.C.), NEAR WAUKARINGA.										
Battery treatment	900	0	0	540	0	0	1,996	15	0	—
Total	900	0	0	540	0	0	1,996	15	0	44½

NEW MEDORA AND GRAINGER COMPANY, MOUNT GRAINGER.										
Battery treatment	260	0	0	59	6	20	148	10	10	—
Total	260	0	0	59	6	20	148	10	10	11½

KIRKEEK'S TREASURE BATTERY, NILLINGHOO.										
Tailings, Cyanided	160	0	0	31	18	0	77	9	10	—
Total	160	0	0	31	18	0	77	9	10	10

WADNAMINGA (Mr. O. W. ALLANSON).										
Battery treatment—										
Virginia	190	0	0	62	0	0	152	15	0	16
Victoria Towers	40	0	0	8	0	0	20	0	0	10
New Milo	14	0	0	12	10	0	31	5	0	44½
“	29	0	0	17	10	0	41	15	0	29
Great Eastern	64	0	0	25	10	0	77	17	7	24½
Golden Record	30	0	0	10	10	0	31	15	0	21
Total	367	0	0	136	0	0	355	7	7	19½

DELORAINÉ GOLD MINES, NO-LIABILITY.
Return of Ore Treated, &c., for Six Months ended June 30th, 1913.

No. of Tons Crushed.	Weight of Gold Obtained.			Weight of Copper Obtained.			Value of Gold.			Value of Copper.			Total.		
	Ozs.	dwt.	grs.	Tons.			£	s.	d.	£	s.	d.	£	s.	d.
157	87	5	0	—			294	17	11	—			—		
148	75	13	4	—			216	18	8	—			—		
145	80	4	3	—			242	2	9	—			—		
151	86	15	3	—			291	10	11	—			—		
148	96	18	22	—			259	1	11	—			—		
151	82	1	10	—			221	9	3	—			—		
900	508	17	18	—			1,526	1	5	—			1,526	1	5

DELORAINÉ GOLD MINES—continued.

No. of Tons. Crushed.	Weight of Gold Obtained.	Weight of Copper Obtained.	Value of Gold.	Value of Copper.	Total.
	Ozs. dwts. grs.	Tons.	£ s. d.	£ s. d.	£ s. d.
CONCENTRATES.					
6.62	17 3 0	2119	68 12 1	13 16 8	82 8 9
6.42	16 1 2	1926	64 4 4	13 7 5	77 11 9
9.19	30 5 14	2545	121 2 3	17 10 6	138 12 9
—	572 7 10	6590	1,780 0 1	44 14 7	1,824 14 8
*3.00	+16 0 0	—900	+95 0 0	—9 0 0	+86 0 0
—	588 7 10	5690	1,875 0 1	35 14 7	1,910 14 8

* Adjustment of estimates vide Review No. 17, page 16.

TOTAL BATTERY AND CYANIDE RETURNS FROM ALL PLANTS
FOR SIX MONTHS ENDED JUNE 30TH, 1913.

Name.	Ore Treated.	Gold Bullion Recovered.	Value.	Yield per Ton, in Shillings.
	Tons. cwt. grs.	Ozs. dwts. grs.	£ s. d.	s.
Tarcoola	313 0 0	264 3 2	912 19 5	58
Glenloth	401 0 0	113 15 20	359 15 4	18
Petersburg	80 16 0	17 14 10	66 12 3	16½
Mount Torrens	174 0 0	10 19 21	41 14 2	14½
Kitticoola	215 0 0	64 1 0	208 7 2	19½
Ajax (Babylonian, G.M.C.)	900 0 0	540 0 0	1,996 15 0	44
New Medora and Grainger	260 0 0	59 5 20	148 10 10	11½
Wadnaminga (O. W. Allanson) ..	367 0 0	136 0 0	355 7 7	19½
Deloraine	900 0 0	588 7 10	1,875 0 1	41½
Kirkeek's Treasure	160 0 0	31 18 0	77 9 10	10
Total	3,770 16 0	1,826 6 11	6,042 11 8	32

REPORTS ON BORING OPERATIONS.

BORING OPERATIONS AT THE YELTA MINE, MOONTA.

Report by Mr. A. W. Matthews, Foreman.

All the boring has been confined to No. 4 Bore, which was carried down to the depth of 732ft. The extremely hard and broken nature of the country was responsible for the slow progress made.

NO. 4 BORE, YELTA MINE.

Angle, 14ft. 8in. in 100ft. Boring started January 28th, 1913, with $3\frac{1}{2}$ in. bit, reduced to $2\frac{3}{8}$ in. at 16ft., and to $1\frac{3}{4}$ in. at 124ft.

Surface	
to	Surface loam and limestone.
16ft.	
to	Grey and blue country rock showing mica and felspar crystals.
45ft.	
to	Very hard and broken felsite porphyry.
84ft.	
to	Quartz.
85ft. 6in.	
to	Hard broken country.
124ft.	
to	Very broken country.
164ft.	
to	Quartz.
164ft. 9in.	
to	Very hard and broken red country.
203ft.	
to	Red and blue country rock showing a little mineral and splashes of sulphide.
260ft.	
to	Country showing mineral.
278ft. 8in.	
to	At 278ft. 8in., 294ft. 4in., 302ft. to 303ft., 308ft., 309ft. to 309ft. 8in., passed through quartz veins showing sulphide. The balance of the cores from 260ft. to 315ft. showed mineral and specks of sulphide.
315ft.	
to	Very hard and broken red country.
595ft. 9in.	
to	Seam showing iron and mundie.
596ft.	
to	Broken red country.
632ft.	
to	Small quartz vein and red country rock.
638ft.	
to	Blue country.
685ft.	
to	Soft flucan.
686ft.	
to	Blue country.
709ft.	
to	Hard red country.
732ft.	

All the machinery is in good order and the new calyx and diamond combination drill is giving every satisfaction.

BORING OPERATIONS AT LEIGH CREEK AND WAUKARINGA.

Report by Mr. C. F. Duffield, Foreman.

On the completion of No. 2 Bore on the Mountain of Light property at Leigh Creek the plant was removed to a site 745ft. E. of No. 1 Bore, and 280ft. back from the line of lode to cut same at 180ft. Angle of bore, 30ft. in 100ft. The country passed through being as follows :—

Surface	
to	Surface loam and limestone rubble.
10ft.	
to	Soft limestone country.
100ft.	
to	Kaolinized matter showing a little green carbonate.
132ft.	
to	Sandstone.
179ft.	
to	Drift sand.
230ft.	
to	Soft slate country.
300ft.	

The plant was then erected on a site 480ft. E. of the main shaft and 300ft. back from the line of lode. Angle of bore, 30ft. in 100ft. Country passed through as follows :—

Surface	
to	Friable limestone country.
73ft.	At 73ft. passed through small seam of green carbonate.
to	Soft sandstone country with occasional bands of slate and seams of
240ft.	ferruginous quartzite.
to	Yellow drift sand.
250ft.	
to	Grey slate.
260ft.	
to	Brown drift sand.
300ft.	

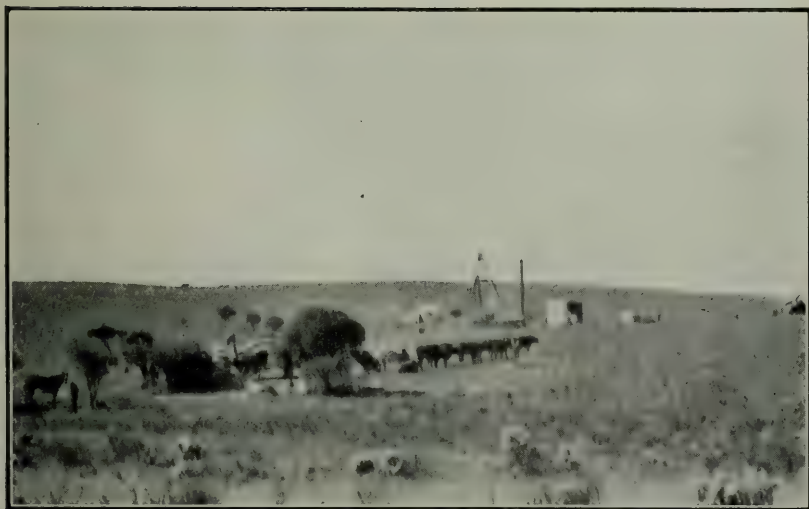
It was then decided to remove the plant to Waukaringa and test the lodes on the property adjoining the S.W. boundary of the Ajax leases.

The position of No. 1 bore is 175ft. back from the line of lode, and 5ft. from the N.E. boundary. The lode is dipping at an angle of 45°. Angle of bore, 30ft. in 100ft. Boring operations were started on April 7th. The country passed through being as follows :—

Surface	
to	Surface loam and limestone.
6ft.	
to	Calcareous slate country with small 38ft. quartz veins.
38ft.	
to	Blue slate country with calcite seams.
131ft. 6in.	
to	Struck lode consisting of quartz and oxide of iron, assaying 6dwts. gold
132ft. 6in.	per ton.
to	Slate formation.
135ft.	
to	Blue slate country showing pyrites in the bottom.
212ft.	



AJAX MINE, NEAR WAUKARINGA,



GOVERNMENT BORING PLANT, NEAR AJAX MINE.

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No. 2 Bore is situated 10 chains S.W. from No. 1, and 210ft. back from the line of lode. Angle of bore, 30ft. in 100ft. The country passed through being as follows :—

Surface	
to	Surface loam and rubble.
4ft.	
to	Grey sandstone rock.
18ft.	
to	Slate country with bands of sandstone.
85ft.	
to	Blue slate country with occasional calcite seams.
183ft.	
to	At 183ft. passed through 2in. of quartz and a little limestone.
308ft.	Blue slate country with quartz seams and iron pyrites.
Total boring for the half-year, 1,120ft.	

PARAMATTA AND YELTA COPPER MINES.

Report by Mr. Frank Richards, Mine Manager.

Mining operations at the Main Shaft workings were confined chiefly to ore raising, but to facilitate the work of stoping approximately 300 feet of development work was completed.

In order to improve the ventilation of the mine, and to provide another outlet from the workings, a new connection was made between the surface and the far southern workings down to a depth 270 feet.

The No. 6 level South was extended a considerable distance in search of further ore bodies, but unfortunately without success.

Stoping was carried on at every level between No. 4 and No. 11, and 9,500 tons of crude ore were raised, assaying just over 3% for copper.

Smelting operations were continuous up to 12th May, last, when the furnaces were closed and the remaining ore sold to custom smelters. The total net value of copper matte produced is £15,864 14s. 7d., whilst the sum of £1,126 3s. 8d. was obtained from the sales of crude ore and dressed molybdenite.

Owing to the failure of the mine to produce sufficient copper to meet expenses, work was suspended on June 30th.

SUBSIDIES.

The Legislature provided in the Mining Act, 1893, and in previous measures for the encouragement of Mining.

The following schedule shows what subsidies have been paid from the inception of the system to June 30th, 1913, and the sums repaid. In the ordinary way these repayments are made from profits—50 per cent. of such profits being devoted to repayments. In two instances only have the profits won enabled full repayments to be accomplished—the Crystal Mine, at Echunga, which repaid £76 7s. 6d. from that source, and the once-famous New Alma and Victoria Mine, Waukaringa, which repaid in full the first subsidy, £3,000. The remainder of the recoveries was derived from sales of mining plant held as security. The total subsidies advanced is £57,656 16s. 7d. of which £7,580 4s. 1d. has been recovered, leaving a debit balance of £50,076 12s. 6d. Portion of this outstanding debt is represented by machinery that has fallen into the hands of the Government; add to this the value of the metals won, and the State in general will probably have benefited beyond the money value of the debit balance.

STATEMENT OF SUBSIDIES PAID FROM COMMENCEMENT TO JUNE 30TH, 1913.

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.			Amount Repaid.		
		£	s.	d.	£	s.	d.
Adelaide Crushing, Grinding, and Amalgamating Mill Co.	—	100	0	0	—	—	—
Algebuckina Gold Mining Syndicate	Algebuckina	52	10	11	52	10	11
Alma Extended Gold Mining Co.	Waukaringa	3,000	0	0	172	5	0
Backhouse, T. S.	Worturpa	100	0	0	—	—	—
Barossa Enterprise Gold Mining Coy.	Barossa, Hundred of	232	2	6	—	—	—
Belalie Copper Mining Syndicate	Bundaleer	392	12	3	—	—	—
Beltana Rapid Ore Treatment Syndicate	Near Beltana	296	8	4	—	—	—
Bevilaqua & Angel	Palmer (near)	57	18	0	—	—	—
Bird-in-Hand Gold Mining Co., Ltd.	Woodside	3,000	0	0	—	—	—
Blackfellow's Creek Gold Mining Co., Ltd.	Kuitpo, Hundred of	660	6	7	35	0	0
Callington Copper Mining Co.	Callington	148	8	7	—	—	—
Cockburn Copper Mining Co., N.L.	Mutooroo	273	18	5	173	13	8
Commonwealth Silver-lead Co., Ltd.	Strathalbyn, Hund. of	750	0	0	52	17	9
Copper Hill Mining Co., N.L.	Kadina	391	15	0	115	0	0
Cornwall Copper Mining Syndicate, N.L.	Kadina, Hundred of	500	0	0	—	—	—
Countess of Jersey Gold Mining Co., N.L.	Wadnaminga	321	0	0	—	—	—
Currency Creek Copper Mining Co.	Currency Creek	28	6	5	20	0	3
Crystal Gold Mining Co.	Echunga	563	17	6	176	7	6
Ding Dong Copper Mining Syndicate	Kanmantoo, Hund. of	124	0	4	—	—	—
Duke of Cornwall Gold Mining Syndicate	Mount Pleasant	458	17	4	43	10	0
Eagle Silver Mining Co., Ltd.	Glen Osmond	500	0	0	—	—	—
Ediacara Consols Silver Mining Co., N.L.	Ediacara	651	12	1	465	17	0
Enterprise Copper Mining Co., N.L.	Barossa, Hundred of	150	0	0	9	16	0
Enterprise Excelsior (Barossa Amalgamated)	"	2,000	0	0	—	—	—
Eureka Gold Mining Co., Ltd.	Woodside	1,500	0	0	—	—	—
Fifth Creek Central Silver and Copper Mining Co., N.L.	Fifth Creek	253	2	4	—	—	—
Fortress Hill Mining Syndicate	Fortress Hill	60	0	0	—	—	—
Glenloth Mining, Battery, & Options Co., N.L.	Glenloth	515	4	7	515	4	7
Glenloth Wells Pioneer Blocks Co., Ltd.	"	100	0	0	22	18	5
Gumeracha Gold Mining Syndicate	Gumeracha	75	0	0	—	—	—
Golden Point Claims	Wonna	50	0	0	—	—	—
Great Ironclad Gold Mining Co.	Teetulpa	218	6	9	—	—	—
Hakendorf, C. H., and Williams, J. (Glenmarkie Mine)	Glenloth	221	17	6	—	—	—
Hamley Copper Mining Co.	Wallaroo	2,000	0	0	—	—	—
Howard Bound and Klondyke Gold Mines, N.L.	Mannahill	192	17	1	—	—	—
Hunter Bros. (Lady Millicent Mine)	Mochatoona	200	0	4	—	—	—

STATEMENT OF SUBSIDIES PAID—continued.

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.	Amount Repaid.
		£ s. d.	£ s. d.
Ireby Gold Mining Syndicate	Mount Grainger	35 4 3	—
Kannantoo Copper Mines Syndicate, N.L.	Kannantoo	80 1 9	—
Kirkeek's Treasure Gold Mining Co.	Waukaringa	691 8 1	—
King's Bluff G.M. Co., N.L.	Olary	622 0 8	—
Kohinoor Gold Mining Co., N.L.	Kangaroo Island	100 0 0	—
Kohinoor Mine (H. G. Taylor)	"	200 0 0	—
Lady Alice Gold Mining Co.	Barossa, Hundred of ..	1,797 2 3	—
Lady Franklin Syndicate	Port Lincoln	200 0 0	40 0 0
Leigh's Creek South Coal Mining Co., N.L.	Leigh's Creek	95 16 4	95 16 4
McMurtie's Claims	Kuitpo, Hundred of ..	199 19 11	—
Mingary Gold Mining Co.	New Luxemburg	400 0 0	—
Montacute Gold and Copper Mining Co., N.L.	Sixth Creek	400 0 0	—
Mount Victoria Mine	Bimbowrie	50 0 0	—
Mount Malvern Silver Mining Co.	Blackwood	491 3 6	—
Mount Malvern Silver-lead Mining Co., N.L.	Clarendon	1,347 15 3	—
Mount Pangæus Gold Mining Co.	Hahndorf (near)	56 1 4	—
Mount Monster Gold Mining Syndicate	Kuitpo, Hundred of ..	350 0 0	1 0 0
Mt. Grainger Ironclad Gold Mining Syn., Ltd.	Mount Grainger	21 18 10	—
Mount Torrens Gold Mining Co.	Mount Torrens	1,000 0 0	—
Mount Remarkable Mining Co., Ltd.	Wongyarra, Hund. of	122 8 1	15 0 0
Musgrave Ranges Prospecting Association ..	Musgrave Ranges	47 2 0	—
Mount Painter Corundum and Gem Syndicate	Mount Painter	47 3 1	—
Morning Star Gold Mining Co.	Teetulpa	68 4 6	—
Mutooroo Copper and Silver Mining Co., Ltd.	Mutooroo	500 0 0	500 0 0
Nackara Proprietary Copper Mining Co., N.L.	Nackara	100 0 0	—
Nackara Proprietary Gold Mining Syndicate.	Nackara	100 0 0	—
New Banksia Gold Mining Syndicate	Nairne	250 0 0	—
New Alma and Victoria Gold Mining Co., Ltd.	Waukaringa	3,000 0 0	3,000 0 0
New Ajax Consolidated Gold Mining Co., N.L.	"	750 0 0	—
New Era Gold Mining Co., Ltd.	Woodside	1,000 0 0	—
New Glenloth Battery and Mining Co., N.L.	Glenloth	750 0 0	—
New Medora and Grainger Gold Mines Syn., N.L.	Mount Grainger	1,421 9 9	—
New Mingary Gold Mining Co.	New Luxemburg	250 0 0	—
New Mount Grainger Gold Mines, N.L.	Mount Grainger	393 7 1	220 0 0
Northern Mining and Smelting Co., N.L. ..	Mount Fitton	350 0 0	—
North Nairne Gold Mining Co.	Nairne	500 0 0	—
North-West and West Australian Pros. Co. .	North-west of S.A. .	104 9 7	—
North-West Prospecting Association, N.L. .	Tarcoola	150 0 0	—
Nil Desperandum Teetulpa Devt. Co., N.L. .	Teetulpa	64 14 4	20 5 6
Nilpena Copper Mining Co., Ltd.	Blinman	290 5 3	—
Onkaparinga Dredging and Mining Co., and Echunga Propy. Hydraulic Gold Sluicing Co.	Biggs' Flat	1,050 0 0	700 0 0
Paul's Consolidated Copper Propy., N.L. . .	Burr Well	525 0 0	13 9 0
Parara Mining Co., N.L.	Maitland	571 3 6	—
Paringa Mining Syndicate	Callington	399 16 8	244 0 0
Paringa and West Kannantoo Consolidated Copper Mine, N.L.	"	1,144 3 4	7 15 0
Pioneer Gold and Copper Mining Syndicate	"	95 15 6	—
Polmear, W. J. L.	Kadina	800 0 0	—
Queen Bee Mining Co., N.L.	New Luxemburg	250 0 0	250 0 0
Quorn Manganese and Silver Mining Co.	Quorn	10 9 10	—
Rapid Bay Silver Mining Co., N.L.	Yankalilla, Hund. of ..	136 2 4	—
Royal Charlie Gold Mining Co.	Mannahill	153 18 5	—
Rees, R., Ajax Mine	Waukaringa	604 14 5	—
Stainbank, A. T.	Fifth Creek	70 14 11	—
Sliding Rock Copper Proprietary, N.L.	Sliding Rock	2,000 0 0	25 7 0
Tarcoola Blocks Gold Mining Co., Ltd.	Tarcoola	3,995 5 2	150 19 11
Tarcoola Enterprise Gold Mining Co., N.L. .	"	100 0 0	19 10 4
Tarcoola Proprietary Gold Mines, N.L.	"	150 4 4	9 15 0
Teatree Gully Gold Mining and Pros. Assn.	Teatree Gully	234 5 7	—
Teetulpa Mining and Crushing Co.	Teetulpa	349 11 4	—
Teetulpa Prospecting Syndicate	"	49 15 6	—

STATEMENT OF SUBSIDIES PAID—continued.

Name of Company or Person to whom Subsidy Granted	Locality.	Amount Advanced.	Amount Repaid.
		£ s. d.	£ s. d.
Tumby Bay Copper Mining Co., N.L.	Hutchison, Hund. of ..	400 0 0	—
Victoria Hill Amalgamated Gold Mining Syn.	Barossa, Hundred of ..	38 12 6	—
Victoria Tower Mining Co., N.L.	Mannabill	345 18 9	90 0 0
Warrakimbo Propy. Copper Mining Synd. .	Barndioota, Hundred of	220 16 2	—
Warra Warra Propy. Copper Mines, N.L. .	Farina	322 4 11	322 4 11
Watt's Gully Gold Mining Co.	Gumeracha	50 0 0	—
Watt's Gully Reef Claims	Gumeracha	50 0 0	—
Wolters, F. C., & Co.	Echunga	25 0 0	—
Wallaroo Central Mining Co., N.L.	Kadina	500 0 0	—
Westward Ho Mine (Dr. H. Dixon)	Mannabill	1,000 0 0	—
Wohler, H., & Co.	Myponga	20 0 0	—
Wheal Turner Copper Mining Co., Ltd.	Prospecting on proposed line to Queensl'd Border	1,000 0 0	—
Winnininnie Gold & Silver Propy. Co., N.L.	Winnininnie	86 3 6	—
Woodside Boring and Mining Syndicate .	Wood-side	422 17 11	—
Worturpa Exploration and Mining Co., Ltd.	Worturpa	800 0 0	—
Yelta New Copper Mining Co., N.L.	Wallaroo	1,000 0 0	—
Young Bullfinch Gold Mining Co., N.L.	Talunga, Hundred of	146 3 4	—
Totals	—	57,656 16 7	7,580 4 1

ACCIDENTS IN MINES AND QUARRIES.

A gratifying feature of our mining operations in mines and quarries is the infrequency of serious accidents. Act No. 858 of 1904, bringing quarries in the same category as mines as regards the control of the Chief Inspector of Mines has been effective in safeguarding the interests of quarry-men. The following table gives the number of accidents in mines and quarries since passing of the Act:—

ACCIDENTS IN MINES AND QUARRIES.

ACCIDENTS IN MINES.				ACCIDENTS IN QUARRIES.			
Year.	Total Number of Accidents Reported.	Number of Persons Injured.	Number of Persons Killed.	Year.	Total Number of Accidents Reported.	Number of Persons Injured.	Number of Persons Killed.
1904	5	1	4	1904	1	1	1
1905	3	1	3	1905	—	—	—
1906	5	—	3	1906	1	1	—
1907	8	4	6	1907	3	1	2
1908	5	4	1	1908	—	—	—
1909	6	5	1	1909	1	1	—
1910	5	3	3	1910	2	1	1
1911	2	—	2	1911	—	—	—
1912	3	2	1	1912	2	—	2
Jan.-June 1913	5	5	—	Jan.-June 1913	—	—	—

ASSAYS AT SCHOOL OF MINES.

NUMBER OF ASSAYS MADE FOR PUBLIC PURPOSES AT THE SCHOOL OF MINES ASSAY DEPARTMENT DURING THE SIX MONTHS ENDED JUNE 30TH, 1913.

	1913.					
	January.	February.	March.	April.	May.	June.
Department of Mines	39	247	204	91	63	133
Public assays	198	168	176	140	166	79
Totals	237	415	380	231	229	212

DECENNIAL RETURN SHOWING OUTPUT AND VALUE OF VARIOUS METALS AND MINERALS PRODUCED IN SOUTH AUSTRALIA SO FAR AS CAN BE ASCERTAINED.

Year.	GOLD.		SILVER.		SILVER LEAD ORE.		COPPER.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ounces.	£	Ounces.	£	Tons.	£	Cwts.	£
1903	8,650	28,650	7,086	804	211	1,267	129,812	417,116
1904	17,897	76,025	—	—	—	—	125,560	382,356
1905	10,983	45,853	—	—	—	—	130,959	426,511
1906	8,037	27,000	801	104	—	—	164,160	718,609
1907	5,609	20,540	5,845	780	1,000	11,000	158,620	690,000
1908	2,908	12,300	—	—	900	9,000	112,554	338,000
1909	7,111	30,206	1,660	167	70	416	113,940	334,584
1910	6,603	28,000	6,250	625	25	22	102,040	306,120
1911	3,537	15,000	1,400	140	—	—	118,440	332,500
1912	6,592	28,000	2,700	326	—	—	125,900	461,500
Totals....	—	311,574	—	2,946	—	21,705	—	4,407,296

Year.	COPPER ORE AND REGULUS.		LEAD.		IRONSTONE FLUX.		LIMESTONE FLUX.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Tons.	£	Cwts.	£	Tons.	£	Tons.	£
1903	7,069	54,922	14,408	8,799	84,932	46,712	—	—
1904	3,051	24,597	—	—	46,687	27,091	43,440	6,516
1905	2,563	28,434	1,040	369	84,483	48,577	44,498	4,791
1906	—	—	1,000	550	75,226	33,852	31,940	4,791
1907	—	—	—	—	84,600	38,100	31,100	5,800
1908	—	—	—	—	88,000	39,600	29,500	6,000
1909	1,230	4,003	140	90	16,120	8,296	13,765	2,464
1910	—	*9,350	400	260	46,200	21,945	18,600	3,720
1911	—	*11,103	—	—	42,300	26,400	28,700	7,175
1912	—	*10,192	—	—	42,200	26,375	50,600	12,500
Totals	—	142,601	—	10,068	—	316,988	—	53,757

Year.	PHOSPHATE ROCK.		CRUDE SALT.		OTHER METALS AND MINERALS.	Total Value.
	Quantity.	Value.	Quantity.	Value.		
	Tons.	£	Tons.	£	£	£
1903.....	1,000	1,000	40,000	12,000	100	571,371
1904.....	3,000	3,000	40,000	12,000	198	531,783
1905.....	5,000	5,000	32,500	13,000	1,261	573,796
1906.....	5,850	5,850	55,000	27,500	2,209	820,465
1907.....	8,000	8,000	75,000	37,500	2,500	814,220
1908.....	11,000	11,000	75,000	37,500	4,500	457,900
1909.....	3,772	3,697	51,407	25,594	3,873	413,390
1910.....	5,200	5,200	54,000	27,000	†13,600	415,942
1911.....	5,800	5,800	65,000	40,600	†11,319	450,054
1912.....	6,100	6,100	64,300	40,187	†10,490	595,670
Totals	—	54,647	—	272,881	50,050	5,644,491

* Bluestone, £5,980; Sulphuric Acid, £3,370.
 " £4,163 " £6,940.
 " £2,550 " £7,642.

† Including Gypsum, £9,000; Pyrites, £3,270.
 " £7,275; " £2,580.
 " £9,000.

REPORT

BY

The Assistant Government Geologist (R. Lockhart Jack, B.E., F.G.S.).

KIRKEEK'S TREASURE MINE.

(*Vide* Record, p. 226, and Reviews Nos. 8, 11, 13, 15, 16, and 17.)

Acting under instructions from the Hon. the Minister of Mines, the writer made a geological examination of Kirkeek's Treasure Mine on the Nillinghoo Goldfield.

The property consists of three leases (Nos. 906, 907, 908) of 20 acres each, and is situated 43 miles by road to the N. of Yunta on the Petersburg-Broken Hill railway.

The country from Yunta to some distance beyond Nillinghoo is underlain by sedimentary rocks of Cambrian age. These rocks consist principally of slates, shales, sandstones, quartzites, and glacial till, and have been folded into a series of synclines and anticlines, the axes of which are in an E. and W. direction. The harder rocks have remained to form the hills and ridges, while the softer material has been eroded to form two gently-sloping peneplains, the divide between which is situated about 5 miles S. of Waukaranga.

It is on one of the lower ridges resulting from the resistance to degradation of the quartzite that the Kirkeek's Treasure lode occurs. The quartzite dips to the S. and its strike, though possibly not its dip, is coincident with that of the lode, which lies immediately to the N., and strikes E. and W. with a steep dip to the S. On the N. or footwall side of the lode is a soft sandstone with shale, with quartzite again on the N.

The lode has been exposed by costeans, outcrops, and two principal opencuts, totalling 320ft. in length, for a distance of 660ft., and there is no evidence to show that this represents the total longitudinal extension of the lode, or that it does not exist beneath the surface debris at either end.

Of the downward continuation of the lode less can be seen, as the greatest depth now accessible is 47ft. below the surface.

A persistent disturbance of the lode a few feet below the surface strikes with it, and dips 45° N. It may be regarded as a normal fault throwing the upper portion of the lode downwards and to the N. The throw is not great, and the continuity of the lode is not everywhere broken. In other places the lode is duplicated on a horizontal plane intersecting the lower and the upper or faulted portion of the lode.

The bottom of the whole of the main workings E. and W. of the shaft, ranging from 25ft. to 47ft. below the surface, is below the influence of this fault, and the lode has been proved below it in the trench 250ft. W. of lease No. 906.

Owing to the timber having been removed from the upper portion of the shaft, the lower workings have been inaccessible for many years.

The following extract from Mr. H. Y. L. Brown's report, dated March 20th, 1897, gives full particulars of the lower workings, which have not been worked since :—

“Below the 40ft. level the shaft is closed up. From the official plans of the mine it appears that the main shaft has been sunk to a total depth of 210ft., and that a crosscut has been driven S. at the 70ft. level, which met the lode 6ft. in, and was continued a distance of 50ft., and that a level has been driven 77ft. on the lode at that depth. The lode proved to be about 10ft. wide here. A winze was sunk on it 24ft., at which depth it was supposed to be cut off by a slide or fault. There is

no clear evidence of this, however. Unless more work in crosscutting and driving proves the contrary, the probability is that the lode will continue down to much greater depths. . . ."

While making certain recommendations, Mr. Brown advises that "the winze at 70ft. be continued down on the lode. If as supposed there is a slide here, it can be followed and the reef recovered. If there is no slide, the reef may be found to make again by sinking the winze deeper. I am informed that a crosscut was put in at 125ft. from the surface in the main shaft, which did not cut the reef where expected. This should not prevent the company from trying to recover it, nor should the conclusion be hastily come to that it has died out altogether."

From these extracts it is evident that the existence of a fault at 100ft. in depth is not definitely established. The winze may have got off the lode, or the latter may have pinched locally.

If it be assumed as a working hypothesis that the lode has been faulted, it is more probable than not that the fault would be similar in strike and direction of throw to the one seen near the surface.

If such a fault does exist, its throw has not been sufficient to bring the lode to the surface to the S., and further, a throw of such magnitude would probably have brought the quartzite to the N. of the thin bedded clay slates occurring in the shaft into the shaft, and there is no sign of this on the waste dump. On the other hand, a normal fault dipping S. would have brought either the sandstone, the lode, or the quartzite of the S. wall into the shaft.

The probabilities, therefore, are that, if a fault does exist, it is of no great importance, and will have thrown the deeper portion of the lode to the S., where the expense of crosscutting to it will be more than offset by the bringing of the ore near the surface by the faulting. Under the circumstances, and in view of what is to be seen of the lode near the surface, the fact of one working place having lost the ore is not to be regarded as seriously detracting from the possibilities of the mine.

The lode itself is composed of quartz and ironstone veins in quartzite and sandstone. The quartzite and sandstone are frequently stained with iron oxide in and beside the lode. Vughs are numerous, and quartz crystals and limonite pseudomorphs after pyrite are well developed in them. Some of the cavities are filled with ochre. Pyrite was observed partly altered to limonite, and fine gold could be seen associated with this specimen. The gold is of high purity, and as much of it is very fine, and occurs in cleavages and on crystal faces, it is probable that secondary rearrangement has taken place on the decomposition of the pyrites.

The ferruginous sandstones and quartzites contain some gold, and the veins of quartz and ironstone which run into the country on either side of the lode carry values, so that the width of the ore body will be determined, not on structural conditions, but by the diminution of the gold content.

A close estimate of this width is not possible. In one place 10ft. is exposed between the walls, and in another, where a fault duplicates the lode, a width of over 31ft. was observed. A little less than half this probably represents the true width at this point. All other widths taken were at spots where one or both sides of the workings consisted of standing lode material. An average of widths in the deepest portion of the workings that were accessible shows a mean width of 9ft. of ore extracted over a length of more than 400ft. along the line of lode, and so far as can be judged from the appearance of the sides of the openings, both walls have only been definitely reached on two occasions.

The width is probably between 9ft. and 14ft., but with systematic working the stopping width will be determined on assay and not on appearance.

Samples were taken from the lode by Mr. H. Jones, Inspector of Mines, and their results are given in a report dated December 18th, 1912. These, together with seven samples taken by the writer from different portions of the lode, are tabulated below :—

Location.	Width sampled.	Taken by.	Gold. dwts.
Pit 230ft. W. of main shaft.....	Dump.	H.J.	3
140ft. W. of main shaft, 30ft. deep	5ft.	R.L.J.	3
120ft. " " 47ft. "	—	H.J.	85
110ft. " " 40ft. "	7ft.	R.L.J.	8
80ft.-100ft. W. of main shaft, ore standing in S. side of stope	—	R.L.J.	3
80ft.-100ft. W. of main shaft, ore standing in N. side of stope	—	R.L.J.	13
W. drive off N. crosscut 66ft. W. of main shaft, 22ft. V.D.	—	H.J.	25
E. side of N. crosscut 66ft. W. of main shaft, 22ft. V.D.	10ft.	R.L.J.	2
Centre of lode N. crosscut (Fault Rock, R.L.J.)	8ft.	H.J.	1
35ft. W. of main shaft, 35ft. deep	—	H.J.	20
15ft. " " 35ft. "	—	H.J.	34
60ft. E. " " 20ft. "	—	H.J.	8
80ft. " " 15ft. "	—	H.J.	4
140ft. " " 15ft. trench.....	—	H.J.	35
185ft. " "	—	H.J.	5
200ft. " "	7ft.	R.L.J.	7
From this open cut 115 tons have been treated for a yield of 10dwts. per ton.	—	R.L.J.	5

These samples and the workings from which they come indicate the presence of a shoot of ore extending for at least 460ft. In addition to this length, the trench E. of the last open cut showed good ore, but the dump has been milled and the trench partly filled in to make a track for a whip horse.

While technically there may not be a great deal of "ore in sight," the amount of "probable ore" is very considerable. As stated before, the lode has been proved for 660ft., and ore won or sampled for over 500ft. and to depths not exceeding 47ft. for an average width of at least 9ft. Mr. Brown records its occurrence at depths of 70ft. and 100ft. At the former place it was 10ft. wide, and at the latter was supposed to have been lost, but the evidence is inconclusive.

Of the ore broken, some is lying with debris from the cap of the lode in the bottom of the workings, a considerable portion, temporarily rejected, is at the surface, and 2,971 tons have been treated for a yield of £2 11s. 8d. per ton. It may be pointed out that lack of water and abundance of ore forced the management to resort to picking to enable the battery to be employed as profitably as possible when water was available, so that ore broken that would more than pay its way through the mill has perforce been left untreated.

From the appearance of the workings the lode itself gives no cause for anxiety. It may be faulted, but faulting does not imply its total loss. Indeed, as in the case of the small fault already seen, a fault may increase the tonnage of ore between certain horizons by duplicating the lode. There are some small workings on gold to the S. of the main workings, but it is improbable that they are on the main lode for reasons already given.

The oxidised zone may be expected to continue to considerable depths, as 1,800ft. E. of the main shaft the water level was proved 390ft. below the crest of the ridge, while 1,000ft. S. a well did not obtain water at 300ft. below the same point.

The mine is equipped with 10 head of stamps driven by a simple horizontal engine, for which steam is provided by a Lancashire boiler. Other plant includes masonry water tanks and settling pits and two steel cyanide vats with various accessories.

Water is obtained from the water shaft, but the supply of 800galls. per day is inadequate, and only permits of intermittent work. Throughout the whole history of the mine the want of water has crippled the undertaking.

The water shaft is stated to have yielded 6,000galls. a day, but the supply was lost on deepening the shaft. The bottom of the shaft, 340ft., is in a soft, somewhat permeable rock below dense quartzite.

In view of the success of several bores in similar strata in the district, which yield supplies of over 10,000galls. a day, it would be advisable to continue the shaft in the softer rock exposed in the shaft bottom.

An alternative or supplementary supply could be got by scooping a reservoir near the water shaft, where there is a suitable site and a good catchment. This would be served by the existing pump and pipe line.

Water was at one time carted from the Gap Well, a distance of a little over 3 miles, and cost 10s. 6d. per ton of ore crushed (1,090 tons). This well is situated about 50ft. (aneroid) below the battery. Sunk to a depth of 115ft. it passes through quartzite and soft sandy shale. The water stands at 60ft. below the surface. It has been drawn upon to the extent of 6,000galls. per day.

The mine will require, if the water be used to the best advantage, about 200galls. per ton of ore treated. There is a reasonable prospect of obtaining a supply by deeper sinking in the water shaft, and failing that, water can be got from a scooped reservoir or by laying a pipe line from Gap Well and pumping the water to the mine. —(13-1-13.)

REPORTS FORMING ADDENDA TO THE RECORD OF MINES

By the Inspector of Mines (Mr. Henry Jones).

MOONTA MINE.—I made a thorough inspection of all the workings on January 7th, 8th, 9th, and 10th.

The underground workings on this property are in two sections operating on two separate ore channels.

The S. section, or "Treuer's" workings, comprise two shafts 35 fathoms apart, and drives have been extended in the ore channel connecting the two shafts at 35, 50, 65, 80, and 100 fathom levels respectively.

All the drives are in good order, and strong log passes have been made between each level, properly equipped with permanent ladder-ways.

The main hauling shaft is equipped with strongly constructed head-gear, winding-plant, man-skip and all necessary safety appliances. The shaft is in three compartments, two are used for hauling purposes and one for pump and ladder-way; both this and the air shaft are strongly timbered and equipped with substantial ladders.

The pumping station is situated near the bottom of the main shaft at the 120 fathom level, where a fairly large pump has been placed in position, and is driven by compressed air. This station is quite safe, and is kept clean and in good order.

The two exits in this section of the mine are kept in splendid condition, with good travelling roads leading to them from all parts of the workings.

The N. section of the mine (or Taylor's workings) extends along the line of lode for a length of 363 fathoms, and comprise Taylor, Hughes, Warmington, and Stuckey's shafts. All of these are connected by drives extended in the ore channel at 200, 220, 240, 260, 280, 300, and 320 fathoms level respectively. At various points in the drive strongly timbered passes have been made and provided with substantial ladders from one level to the other.

The pumping appliances in this portion of the mine consists of a series of plunger pumps of the Cornish type, *in two sections*, the one in Taylor's shaft pumping from the bottom, or 320 fathoms, up to the 200 fathoms, from that point the water runs along a drive to Hughes' shaft and is pumped up to the surface by the main pump. The two pumps are connected with the powerful pumping plant on Hughes' shaft, and both are worked simultaneously.

Pumping station on surface and the various stages down the shafts are perfectly free from any accumulation of combustible material, and everything is kept in good working order.

Taylor's shaft, which is the main hauling one at present, is equipped with substantially constructed head-gear, winding-plant, man-skips, and safety appliances and a good ladder-way in one chamber from surface to the bottom of the shaft; also a line of pipes down the shaft with branch pipes to each plat conveying fresh water for drinking purposes.

The other exits connected with this section of the mine are Hughes', Warmington's, and Stuckey's shafts—these are all equipped with strong and permanent ladder-ways, and are accessible from all parts of the underground workings.

Most of the old open stope workings in the mine have been filled in with mullock, the various drives and workings are all properly secured with timber, and everything in connection with the mine and surface plant and machinery appears exceedingly safe, and are kept in splendid working condition, giving every facility in the case of fire or other accidents that may occur for the employes to ascend or descend from all parts of the workings with the least possible delay. (10-1-13.)

HAMLEY COPPER MINE.—Inspection of the underground and surface workings made on January 14th.

The main workings on the property are two underlie shafts sunk in the Karkarilla lode, 180ft. apart. Both of these shafts are equipped with good strong ladders from surface to bottom, and No. 2, the main hauling shaft, is also equipped with a well-constructed skip road, strong head-gear, fairly large winding winch, and all necessary appliances for hauling lode material and water to surface.

Drives N. and S. on the course of the lode have been made at 30, 40, 50, 60, and 70 fathoms levels respectively, the 50 and 70 fathom drives are connected with the two shafts, and have been made the main travelling roads from one to the other. The various drives in the mine are all strong and securely timbered, and the stopes are filled with mullock by means of a pass recently made from the N. workings up to the surface.

There are no pumps working underground, and the water making in the mine is hauled out to the surface in large iron tanks of the skip type with self-acting appliances for filling and emptying.

The plant and machinery on the mine are kept clean from surplus oils or any waste material and in good working order.

All the ladders and passes in the different levels are kept in good order, and the two exits (or shafts) are accessible from all parts of the mine, giving every facility in case of fire for the men employed below to get safely to the surface. (14-1-13.)

COWELL SILVER FIND.—Hundred Miltalie, Franklin Harbor district (*vide* Review No. 17).

An extensive belt of highly mineralised country traverses the district in which several mines were opened out and worked many years ago to shallow depths, chiefly for copper, but of late years very little attention appears to have been given to mining in this part of the State. The country for many miles is hilly, and from 1,000ft. to 1,200ft. above sea level, and affords exceptional facilities for prospecting work.

Mr. Atkinson's silver find is on claim No. 9467, and is situated on top of a hill 300ft. above the level of the gully; prospecting and development work are in progress on the property.

At the point on the hill where the rich ore was discovered an opening 6ft. long has been made to a depth of 9ft.; the ore body is on the W. side of it, and was apparently covered with about 6in. of dark soil with no outcrop showing. For a depth of 3ft. 6in. down from the surface the ore body has been taken, and it proved to be very rich in silver—one block of ore sent to Adelaide weighing 195½lbs. is estimated to contain 593ozs. of fine silver valued at £78 7s.

Good solid ore, 12in. to 15in. wide, is at present showing in the N. end of the pit, and appears to be bearing N. 10° E. and going down vertically. In the S. end of the hole the ore appears to have split into small seams and is not well-defined.

Close to the new find, on the W. side, a vertical shaft has been sunk to a depth of 28ft. At that level a crosscut has been extended E. for a total distance of 17ft. The country passed through in the crosscut appears to have been greatly disturbed by faults, and consists chiefly of loose and decomposed limestone, with little quartz; no lode formation was encountered.

In the face of the crosscut a well-defined wall of one of the faults is exposed, dipping at a slight angle to the E., and everything indicates that a large amount of movement has taken place at one time in the country rocks in the vicinity of the present workings, which doubtless is the cause that the ore body has not been intersected in the crosscut, at present level, but so far, owing to the limited extent of the workings, it is a very difficult matter to determine the true trend and the extent of the displacement. The best course to adopt under the circumstances

would be to either sink down in the ore body or sink down the present shaft to the settled country, and crosscut both E. and W. to pick up the continuation of the ore at greater depth.

Trenching at right angles to the line of strike is in progress, both N. and S. from the main shaft, with a view of testing the ground in these directions for other lodes, and to locate the proper trend of the present deposit.

About 100yds. S. from the silver find, and fully 90ft. below it on the side of the hill, an open cut has been started and extended N. in a well-defined lode formation bearing N. and S. and going down vertically. The matrix between the walls is 6ft. wide and consists mainly of ferruginous quartz, decomposed limestone, and numerous iron veins, lin. to 2in. thick, running parallel with the channel; it appears a likely formation to carry gold, and worth being further developed.

Owing to the limited amount of work done in the rich ore deposit on the hill little can be said as to how far this extremely high-grade ore will continue; but, judging from general indications, it appears quite likely that the faults and dykes at various points will probably affect the value as well as the strike and downward course of the ore in places, and make it difficult to follow until the proper trend of the displacements are determined, which can be done best by systematic prospecting and deeper sinking.

The material in the crosscut at the 28ft. level was sampled, and proved to contain no values.

Sample taken from 3ft. 6in. from surface and for a width of 2ft. 9in. gave 281ozs. silver, 2.0 per cent. copper, and 58.0 per cent. lead.

Sample from solid block of ore 12in. wide, N. end of hole—2,228ozs. silver, 3.4 per cent. copper, and 58.3 per cent. lead.

Hand sample taken from different bags of ore on surface. This was taken roughly, and can only be regarded as an approximate value of the ore. It assayed 2,997ozs. of silver, 3.6 per cent. copper, and 3.2 per cent. lead.

In the last three samples the chief minerals were cerussite, hornsilver, malachite, and azurite.

Two samples were taken from a prospecting hole 30ft. N. from the main shaft, which had been sunk in decomposed ferruginous limestone stained with copper, gave:—

One from N. end	1.3 per cent. copper; silver, nil
One from S. end	Nil.

In my examination of the property I find the formation at present is not of a well-defined character; but the fact of its being situated in highly mineralised strata, and the extreme richness of the discovery, fully warrant further explorations, both on the surface and at depth. (17-1-13.)

McNAMARA'S MINERAL CLAIMS.—Situated N. and adjoining Atkinson's silver find, hundred Miltalie.

The property consists of three mineral claims. On block No. 9462 a fair amount of prospecting work has been done at various points, and recently a vertical shaft was sunk to a depth of 22ft. The country disclosed being chiefly schist, with a small irregular vein of decomposed claystone 2in. to 4in. wide. Samples taken of the material exposed in the shaft down to the present depth gave, on assay, no values.

This property, being in a direct line with the apparent strike of the rich ore discovered on the adjoining property, should be thoroughly prospected by trenching the ground in an E. and W. direction from surface down to bed rock, and the work done would be of great assistance in deciding on deep sinking and future operation. (17-1-13.)

SMITH AND ATKINSON'S MINERAL CLAIMS (Nos. 9496 and 9497).—Situated N. of and adjoining McNamara's.

Vigorous prospecting work is being carried on at various points on this property, and a large amount of deep trenching and open cut work has been done.

Near the centre of block 9497 an E. and W. trench has been made for a length of 25ft., in which is disclosed a lode formation bearing N. and S. with a W. underlie. The outcrop shows a width of from 1ft. to 3ft., and consists of a little quartz and slate containing blue and green carbonates. A sample taken for a width of 2ft. gave 2·7 per cent. copper.

About five chains further N. open workings have been made E. and W. for a length of 35ft. In the W. end of the trench a promising lode formation is disclosed, bearing N. and S., dipping W. Copper-bearing material is exposed for a width of about 2ft., and consists of ferruginous decomposed rock and silicious ironstone containing thin seams of copper ore, chiefly malachite and azurite and a little silver. Two samples taken from the outcrop gave on assay :—

One, picked sample, 2ozs. 4dwts. of silver and 31·9 per cent. copper per ton ; and No. 2 sample 1oz. 12dwts. silver per ton and 18·3 per cent. copper.

The outcrop of copper-bearing formation is visible on block No. 9496, but no work can be carried on in that part of the property until the wheat crop has been removed. Sample taken from near the surface assayed 4ozs. 4dwts. of silver per ton and 18·7 per cent. copper.

The prospects of the copper-bearing material outcropping on this property, as shown by the samples, are very encouraging ; but, until more development work has been done little can be said in regard to the extent and permanence of the ore shoots.

The country rocks enclosing the ore deposits are favorable for shaft sinking, and it appears to me that the best and cheapest way to further prove the property would be to put down underlie shafts to reasonable depths in the formations and then put in drives both ways in the ore channel. (17-1-13.)

MAROWIE MINE (*vide* Record, p. 79, and Review No. 17).—Situated 15 miles N.W. from Cowell.

The holding consists of two 40-acre blocks adjoining the N. boundary of Smith and Atkinson's. A large amount of prospecting work appears to have been done at one time on a number of copper-bearing formations outcropping at different points on the blocks, and at one point a shaft has been sunk (judging from the size of the dump) to a depth of from 120ft. to 130ft. The old shaft is now in a dilapidated condition, and the underground workings could not be examined.

In several of the open shallow pits copper-bearing formations are exposed, varying in width from 1ft. to 2ft., and in one hole is showing a fairly defined lode 6ft. wide composed of ferruginous quartz and schist containing copper ore, chiefly malachite and azurite.

A sample taken from the wide lode gave	5·7	per cent. copper
“ “ “ dump on old shaft	4·2	“ “
“ “ “ outcrop of vein	3·9	“ “

A picked sample from old dump gave 11·1 “ “ 12dwts. silver

The surface prospects on these blocks are fairly encouraging and justify exploration work at greater depth. (17-1-13.)

THE OLD PAUL COPPER MINE.—Situated in the hundred of Miltalie, about 15 N.W. from Franklin Harbor.

No work has been done in this mine for many years, and most of the old workings are in a bad state and could not be examined.

The property at present is held, and it is intended, as soon as possible, to resume mining and prove the mineral deposits to a greater depth.

Old Workings.—A fair amount of open cut work to a shallow level has been done N. and S. along the outcrop of the formation, and (it is said) some tons of high-grade ore were obtained from the workings.

At one point a shaft has been sunk 16ft. vertically and 15ft. on the underlie of the lode to the W. The formation disclosed is from 2ft. to 3ft. thick, containing bunches and seams of copper ore, chiefly malachite and azurite. A sample taken from a small vein 3ft. wide, near the footwall, gave 16.2 per cent copper. (17-1-13.)

THE MILTALIE SILVER-LEAD AND COPPER MINE (*vide* Reviews Nos. 12 and 15).—Situating 17 miles N.W. from Franklin Harbor.

A large amount of good development work has been accomplished on the property: three shafts sunk, which are connected by drives and a winze at the 62ft. level. One of the shafts is equipped with a winding and pumping plant and the necessary appliances for carrying on mining work. For further particulars *re* the underground workings, see "Mining Review" No. 15, page 30.

This property has recently been acquired by a syndicate, and some preparatory work prior to resuming mining operations is now in progress. A fairly large concentrating plant has been landed on the mine ready for erection, and a large dump of second-class ore on surface has been prepared ready for further treatment.

The installation of concentrating plant on the mine should be of great assistance in carrying on future operations, as a much larger quantity of lode material can be treated than with hand-dressing. Three grab samples of the second-class ore on surface were taken and assayed:—

One gave 1oz. 4dwts. of silver, 1.8 per cent, copper, and a trace of lead.

No. 2 gave 18dwts. of silver, copper nil, and 19.9 per cent. lead.

No. 3 gave 1oz. 4dwts. of silver, 3.6 per cent. copper, 48.3 per cent. lead.

(18-1-13.)

YALPOODNIE COPPER AND LEAD MINE (*vide* Reviews Nos. 12 and 17).—Situating 16 miles from Franklin Harbor.

A fair amount of mining work has been done at one time on this property, but for several years the mine has been idle. Most of the old workings have fallen in, and the two shafts are partly filled up with debris.

The copper-bearing formation traversing the property is disclosed in several shallow pits and open workings along the line of strike for a length of about 200yds.

Adjacent to the S. shaft, near the surface, the workings extend for 30ft. in length and to a depth of 10ft. to 15ft. The ore body disclosed is well-defined, and consists of ferruginous quartz and ironstone veins impregnated with green and blue carbonates for a width of from 4ft. to 6ft. A sample taken from a depth of 15ft. gave 7.0 per cent. copper, and one from a depth of 10ft. 3.2 per cent. copper. Hand sample taken from dressed ore on surface—1oz. 8dwts. silver, 12.3 per cent. copper, and 0.8 per cent. lead.

A local syndicate recently acquired this property, and work on the mine has been resumed; and, as the primary object is to prove the ore bodies at greater depth, the best and probably the cheapest plan would be to put down a shaft a little W. from the old workings to intersect the main lode at about 100ft., then crosscut the country to prove the eastern formation at the same level. (18-1-13.)

MOUNT MILLAR SILVER-LEAD MINE (*vide* Reviews Nos. 12 and 17).—Situating on section 157, hundred of Hawker, 16½ miles W. from Franklin Harbor.

Since my last visit to this property the main shaft on the block has been cleaned out and sunk to a total depth of 40ft. This shaft, which is nearly vertical, appears to have been sunk in disturbed and broken country on an irregular seam of decomposed schist containing in places isolated bunches of galena of fairly high grade. The seam is ill-defined, and appears to be a leader (or an off-shoot) from other ore deposits that are apparently in the vicinity. Two samples taken of the vein

material in the bottom of the shaft gave on assay no values. One sample taken of galena on surface, which was obtained in sinking the shaft, gave 1oz. of silver per ton and 77.2 per cent. lead.

Prospecting work has recently been done at different points on the surface, both N. and S. from the main shaft, and in some of the holes small specks of galena are showing in decomposed material, and, although no lode formations are disclosed, the indications are very encouraging and fully warrant further prospecting work by long trenches made down through the surface deposit in an E. and W. direction. Sample taken from a surface hole S. of shaft gave 4.5 per cent. lead and trace of silver. Sample taken from hole 5 chains further N. gave 0.5 per cent. lead and trace of silver. (19-1-13.)

CALCOOKRA COPPER MINE (*vide* Reviews Nos. 12 and 15).—Situated in the hundred of Hawker, 18 miles W. from Franklin Harbor.

A large amount of necessary development work has been accomplished on this property. Three shafts have been sunk and drives extended into the lode, and a fair quantity of high-grade ore was obtained from the workings.

In the underlie shaft the shoot of ore operated on down to water-level, a depth of 40ft., appears very promising, and consists of ferruginous quartz and decomposed schist, 1ft. to 3ft. wide, containing rich seams of copper ore, chiefly malachite and azurite and some silver. Five samples of the lode material were taken from different parts of the workings and assayed—

No. 1. From 40ft. level for a width of 2ft., gave 3ozs. silver per ton and 8.2 per cent. copper.

No. 2. From 40ft. level, gave 1oz. 6dwts. silver and 12.0 per cent. copper.

No. 3. From 20ft. level, gave 31ozs. 16dwts. silver and 31.4 per cent. copper.

No. 4. From 20ft. level, gave 0.4 copper.

No. 5. From quartzite near Hill shaft, gave 1oz. 10dwts. silver and 2.1 per cent. copper per ton.

The developments so far on this property are very encouraging, and to further explore the ore body and open out the mine a site should be selected some distance N.E. from the underlie to put down a main shaft to intersect the formation at a reasonable depth, and to extend drives in the ore channel. (19-1-13.)

FAIRBANK'S MINERAL CLAIMS.—Situated in the hundred of Hawker, 18 miles W. from Franklin Harbor.

They consist of two blocks of 40 acres each adjoining the S. boundary of Atkinson's claims, where rich silver ore was recently discovered.

A large amount of good prospecting work has recently been done at different points on the property, consisting of several deep trenches and pits extending in an E. and W. direction across the apparent trend of the formations in the locality. At one point a shaft is down a total depth of 15ft.; the material passed through consists of schist and limestone, with small seams of decomposed rock. A sample taken from the bottom of the shaft gave a trace of silver and 0.4 per cent. lead.

A few chains N. from the shaft a trench has been made 10ft. long and 5ft. deep. The material disclosed is similar to that in the shaft. A sample taken gave trace of silver and 0.6 per cent. lead.

About 12 chains S. from the shaft an open trench has been made for a length of 70ft., and a sample from this trench gave no values, and a sample taken from the outcrop of a formation in the vicinity gave nil. The property is worth being further prospected for both copper and lead. (21-1-13.)

STRATHALBYN COPPER AND SILVER-LEAD MINE (*vide* Record pp. 135 and 185).—Situated about $2\frac{1}{2}$ miles N. from the township of Strathalbyn.

A large amount of mining work appears to have been carried on at one time on this property. A number of underlie shafts have been sunk at different points

in lode formation bearing N. and S. dipping E. The lode matrix showing in the dumps at various shafts consists chiefly of quartz, ironstone, and micaceous schist containing high-grade copper ore and a little gold and silver.

At the N. end of the property an underlie shaft is down a total depth of 35ft. At that level a drive N. in the ore channel is in 60ft. The lode formation showing in the drive for the first 45ft. is from 1ft. to 3ft. wide of ferruginous quartz and schist containing copper ore. For the last 15ft. the ore channel is contracted and the vein in the face is small—apparently the drive has passed through one shoot of ore but has not been extended far enough in the narrow channel to test the ground completely. At a distance of 40ft. from the shaft a winze has been sunk in the formation to a depth of 8ft. : the lode in the bottom is fully 2ft. wide, containing seams of copper carbonates. Samples assayed as follows :—Taken for a width of 2ft. gave 13·2 per cent. copper and 16dwts. silver. Of lode material in the hanging wall of the winze 5·1 per cent. copper and 10dwts. of silver per ton. From the face of the N. drive, a trace of gold and 8dwts. silver per ton. Of the lode 20ft. N. from the shaft 3·8 per cent. copper and 10dwts. silver per ton.

About 20 chains S. from the last workings a shallow pit has been sunk in the formation, but at time of my visit the hole was full of rubbish and water. On the N. end of the pit a well-defined quartz lode is exposed—2ft. wide—containing malachite and azurite. A sample taken from the outcrop gave 10·3 per cent. copper and 4dwts. of silver per ton. A picked sample of the ore in the dump gave 16·2 per cent. copper, 3ozs. 4dwts. of silver per ton, and a trace of gold.

Several claims farther S. on the line of strike there are two old underlie shafts 150ft. apart, but as both shafts are in bad order and full of water there was no chance of examining the formation operated on. In the S. shaft, which is the deeper of the two, a fair amount of work appears to have been done in the lode material disclosed, and the ore extracted from the workings was apparently smelted on the mine. The lode material in the various dumps and on the old dressing floors is of good quality, and consists of ferruginous quartz and schist containing malachite, azurite, silver, and gold, as shown by the four samples taken and assayed—

No. 1. From dump, shallow shaft, 5·0 per cent. copper, 1dwt. gold, 8dwts. silver per ton.

No. 2. From dump, S. shaft, trace copper, trace gold, 18dwts. silver per ton.

No. 3. From dressing floor, 5·6 copper, 2dwts. gold, 1oz. 4dwts. silver per ton.

No. 4. From smelted slag, which gave 0·9 per cent. copper, 24·2 per cent. lead, 17·0 per cent. zinc, 4dwts. gold, 40ozs. 12dwts. silver.

At a point about 5 chains S. from the last workings an underlie shaft has been sunk in the lode to, judging by the dump, a depth of about 130ft. Ferruginous lode matrix is showing in the dumps on the surface containing high-grade carbonate ore. A sample taken from No. 1 dump gave 7·7 per cent. copper and 3dwts. gold per ton. A sample from No. 2 gave 1·6 per cent. copper, 1·1 per cent. lead, 3dwts. gold, and 15dwts. silver per ton.

About 18 to 20 chains S. from last workings, and near the S. end of the blocks are situated the principal workings of the old mine, consisting of two underlie shafts 8ft. x 4ft. in the clear—sunk 70ft. apart and to a depth, as far as I could ascertain, of 30 fathoms. Both shafts are now filled with water to within 50ft. of the surface. From surface to water-level the N. one (or new shaft) is in fairly good order and equipped with ladders down to the 50ft. level. At that point in the shaft a drive N. in the ore channel has been carried in a total distance of 40ft. The formation in the drive is fairly defined, bearing N. and S., dipping E., and is chiefly composed of talcose schist containing lead, silver, zinc, and a little gold for a width of from 2ft. to 5ft., but in the face of the drive the lode is contracted to about 12in. It appears that driving N. at this level had been discontinued after the drive had gone a few feet through the first ore shoot.

A sample taken from the face of N. drive gave 0·7 per cent. lead and 16dwts. silver per ton. A sample taken 5ft. back from face gave 0·6 per cent. lead, 16dwts. silver per ton.

Three samples, taken in sections for full width of lode 20ft. in the drive—

First section, 12in. near hanging wall, gave 15·4 per cent. lead, 0·3 per cent. copper, 9ozs. 18dwts. silver, gold trace.

Section second, for 2ft. centre of lode, 4·9 per cent. lead, 7ozs. 2dwts. silver

Section third, for 2ft. near footwall, 1·7 per cent. lead, 16dwts. silver, and 1dwt. gold.

At the 15ft. level in the shaft a drive has been extended about 12ft. N. in the formation, which consists of talcose from 2ft. to 3ft. wide. A sample taken for a width of 2ft. in the face of the drive gave 0·5 per cent. lead and 2·0 per cent. zinc, 6ozs. 10dwts. silver, and 1dwt. gold per ton.

Four samples of lode material in the surface dumps—

No. 1. New shaft dump, of $\frac{1}{2}$ a ton of ore on surface from below water-level, gave 6·7 per cent. lead, 25·0 per cent. zinc, and 4ozs. 18dwts. silver per ton.

No. 2. Dump, old shaft, 1·2 per cent. lead, 0·75 per cent. zinc, 0·2 per cent. copper, 1oz. silver.

No. 3. Dump, old shaft, 1·5 per cent. lead, nil zinc, 0·3 per cent. copper, 6ozs. silver, and 1dwt. gold.

No. 4. N. shaft dump, 5·7 per cent. copper, 10dwts. silver, and 1dwt. gold per ton.

At a point about 2 chains E. from the main shafts a shallow hole has been sunk in what appears to be a parallel formation, but until more work has been done to fully disclose the lode material little can be said as to its proper value. A sample taken from the material showing gave 0·5 per cent. lead and 0·7 per cent. copper.

The lode formation traversing the blocks has been operated on at different points along the line of strike, and, as shown by the number of samples taken of lode material from the different surface heaps and the accessible parts of the old workings, the values are encouraging, and the mine, as a speculative venture, appears a very promising show. (30-1-13.)

THE WEST BURRA COPPER MINE.—Situated on section No. 116 in the hundred of Hanson, $3\frac{1}{2}$ miles S.W. from the famous Burra Mine.

The discovery of copper ore on this property recently was made quite accidentally. A large quantity of stone was being carted out from Mr. Forrest's cultivated field and deposited on the side of the road. Mr. Blott, who was employed at the time breaking road metal, discovered that several of the rocks were impregnated with copper carbonates. This led to a search being made to locate the particular part of the field where copper-bearing rock had been ploughed up, and at one place several bits of copper ore were found in the soil; but, as there were no outcrops of lode showing, the ground at that point was trenched, with the result that a large lode formation, containing rich malachite, was disclosed 18in. below the surface.

In two of the surface workings a strong lode formation is disclosed, bearing E. and W. with a slight angle to the S., chiefly composed of ferruginous calcite with malachite and copper glance, varying in width from 1ft. to 4ft.

At one point an underlie shaft has been sunk in the lode to a depth of 30ft. The formation all the way down the shaft is fairly defined and contains rich veins of carbonate ores. For the last 5ft. or 6ft. of sinking, and in the bottom of the shaft, the lode is fully 5ft. wide of ferruginous calcite with a seam of malachite 3in. to 4in. wide on the hanging wall. The formation at this level appears very promising and likely to continue down.

At the 26ft. level, in the shaft, a start has been made to drive W. The lode is 4ft. wide carrying high-grade ore, but as the drive is so near the surface comparatively very little ground will be above it for stoping out. A much better plan to undertake would be to stop driving and resume shaft sinking. The present prospects fully warrant continuing the shaft down to a reasonable depth to further prove the ore deposit in the solid country.

So far the prospects in the present workings are highly encouraging, with fair indications that the new find is a permanent lode and well worth being further developed.

The following samples were taken from different parts of the workings, and were assayed at the School of Mines, Adelaide :—

- No. 1. For 2ft. bottom of shaft—2·8 per cent. copper.
- No. 2. For 1ft. 6in. near footwall—0·3 per cent. copper.
- No. 3. For 2ft. centre of lode—Nil.
- No. 4. Hanging-wall vein, 6in.—27·8 per cent. copper.
- No. 5. Hanging-wall material—0·25 per cent. copper.
- No. 6. Face W. drive for 2ft.—12·2 per cent. copper
- No. 7. W. drive for 2ft.—31·3 per cent. copper and 18dwts. silver per ton.
- No. 8. Hanging-wall vein, 4in.—39·9 per cent. copper.
- No. 9. From 12ft. down shaft—34·8 per cent. copper.
- No. 10. From 20ft. down shaft, vein 6in.—33·8 per cent. copper and 18dwts. silver per ton.
- No. 11. From fines on dressing floor—19·0 copper and 10dwts. silver per ton.
- No. 12. From all the dumps of ore on surface—7·8 per cent. copper.
- No. 13. From hole 4ft. deep, 20ft. W. from shaft—0·9 per cent. copper.
- No. 14. From outcrop of N. and S. lode—0·1 per cent. copper.—(20-2-13.)

THE MOUNT MALVERN SILVER-LEAD MINE (*vide* Record, page 183, and Reviews Nos. 8 and 9).—Situated on Mr. Partridge's property, about 15 miles from Adelaide.

A large amount of good developmental work has been done on the property, and considerable quantities of high-grade ores mined and treated from the old underlie workings.

The principal workings are in connection with a vertical shaft 9ft. 6in. x 3ft. 10in. in the clear, sunk to a depth of 320ft., substantially close timbered from surface to bottom and divided into three compartments. Two of the chambers are equipped with runners for hauling purposes, and the other with strong ladders.

At the 215ft. level a plat has been made, and from this a crosscut extended S., intersecting the main lode at a point 60ft. in from the shaft.

From the crosscut a drive W. on the course of the formation has been carried in a distance of 53ft. The ore channel disclosed in the drive is a true fissure, varying in width from 2ft. to 4ft., containing high-grade silver-lead and copper ore, chiefly galena, cerussite, and malachite in silicious ironstone and decomposed sandstone; and, for the last 10ft. in the bottom of the drive, a well-defined solid seam of galena is disclosed, 12in. to 15in. wide. The ore body is strong and well-defined, and could conveniently, and at comparatively small expense, be further proved at this point by sinking a winze from near the face of the drive down to the 306ft. level.

The discovery of such a promising shoot of high-grade ore in the W. drive, a distance of fully 200ft. W. from the old workings, is very encouraging, and fully warrants the drives being further extended in that direction to prove the unexplored portion of the property.

The E. drive at 215ft. level, opposite the last, is in a total distance on the course of the lode of 222ft., and has been connected with Harvey's underlie shaft, and at a point 162ft. in from the crosscut a rise is up through to the 180ft. level, where a

fair amount of stoping work has been done recently in the lode, and 36 tons 9cwt. of ore were extracted averaging 55·5 per cent. lead and 12ozs. silver per ton.

A large lode formation is disclosed in the drives and stope workings in this part of the mine, consisting mainly of barite and decomposed sandstone—6ft. to 14ft. wide—containing several seams and bunches of galena, varying in thickness from 2in. to 9in. The formation is well-defined, and when the property is opened out should not be expensive to work. In operating on the lode a large amount of high-grade ore could be sorted and the other portion of the lode material could be concentrated, and should yield good results.

The developments so far on this property are highly encouraging. The large lode formation disclosed at the various levels appear of a permanent nature and contains high values in lead and silver, as shown by returns from ore treated, with every prospect of values improving as depth is attained.

The main vertical shaft is equipped with a double cylinder winding engine with a large Cornish boiler, enclosed in a substantial wood and iron building; also a strong head-gear 40ft. high has been placed over the shaft and all necessary appliances for hauling purposes. The whole of the plant has been substantially erected, and is in proper order to work the mine on a fairly large scale to a depth of from 5ft. to 600ft.

Seventeen sample of ore taken at various levels and surface dumps gave the following returns:—

	Silver.	Lead.	Copper.
No. 1. Surface dump	12oz.	11·2°/o	1·6°/o
No. 2. " "	18oz. 4dwts.	77·1°/o	Nil
No. 3. " "	8oz.	47·1°/o	Nil
No. 4. " " Copper ore	23oz. 8dwts.	Nil	26·2°/o
No. 5. 215ft. level	1oz. 16dwts.	8·9°/o	Nil
No. 6. " "	15oz. 12dwts.	34·5°/o	Nil
No. 7. " stope	5oz.	21·0°/o	—
No. 8. " "	4oz.	16·7°/o	—
No. 9. 175ft. level	8oz. 6dwts.	43·1°/o	—
No. 10. " "	5oz. 8dwts.	22·8°/o	—
No. 11. 140ft. " vein, 9in.	12oz. 4dwts.	58·0°/o	—
No. 12. " " " 4in.	16oz. 6dwts.	57·1°/o	—
No. 13. " " " 4in.	12oz. 16dwts.	55·5°/o	—
No. 14. 215ft. lead vein, 15in.	11oz. 10dwts.	83·9°/o	New shoot of ore
No. 15. " copper vein, 6in.	61oz. 14dwts.	Nil.	6·3°/o
No. 16. Old dump, Harvey	4oz. 2dwts.	10·5°/o	0·2°/o
No. 17. " " "	12oz. 16dwts.	18·5°/o	0·4°/o

(26-3-13.)

UTICA COPPER MINE (*vide* Review No. 16).—Situated in the hundred of Kooringa, 6 miles S.E. from the Burra Mine.

A fairly large amount of necessary prospecting work has been done at various points on the property, and in the shallow pits and open-cut workings several copper ore-bearing formations are exposed, consisting mainly of quartz varying in width from 3ft. to 12ft., thickly impregnated with small nodules and pockets of malachite and azurite.

All the different formations disclosed on the surface and workings are fairly strong, with every indication of permanency, and well worth exploration work to prove them at greater depth.

At one point on the block there are two parallel lodes $2\frac{1}{2}$ chains apart; the lode matrix showing is from 3ft. to 6ft. wide, containing a fair amount of high-grade copper ore. A site has been selected for an underlie shaft to be sunk in each to depths of at least 100ft. A contract for the work has been made, and sinking of

the two shafts is now in progress. The work above mentioned will prove the values of the ore bodies going down, as well as determine the true trend and dip of the formations, which will be of great assistance when selecting a site for the main vertical shaft to work the mine on a large scale.—(3-4-13.)

EDIACARA SILVER-LEAD MINE (*vide* Record, page 168, and Reviews Nos. 9, 12, and 13).

The principal work in progress on the property at present chiefly consists of shallow prospecting pits and open cuts made at different points W. and S. from the old workings to further prove the unexplored portion of the holding.

About 15 chains W. from the old smelter an open cut has been made on the E. side of the gully for a length of 10ft. by 3ft. deep disclosing large boulders and fragments of lode matrix, containing high percentages of silver-lead ore for a width of 4ft., and indications in the present workings and along the surface in the vicinity are favorable for the occurrence of lode formations, and fully warrant further exploratory work being done at this point on the block. A sample taken of the ore-bearing material in the workings gave 57.1 per cent. lead and 4ozs 4dwts. of silver per ton.

S. from the last workings, near the water shaft, a large amount of open cut work has been done along the outcrop of a fairly defined lode formation, 2ft. wide, bearing N.E. and dipping S.E.; the lode matrix consists of limestone and decomposed sandstone containing lead and silver. A sample taken from the full width of lode (2ft.) gave 37.6 per cent. lead and 8ozs. of silver per ton. A sample taken from ore dump gave 31.4 per cent. lead and 7ozs. 16dwts. of silver per ton. The ore-bearing material is exposed in the workings for a length of 30ft., and appears likely to continue to a depth.

A short distance S.W. from the water shaft a small amount of prospecting, to a depth of 2ft. has disclosed an ore body chiefly quartz containing seams and bunches of galena. The outcrop is fairly defined and strong, and should be tested to a greater depth. A sample taken from near the outcrop gave 10.8 per cent. lead, 7ozs. 8dwts. of silver per ton, and 0.2 per cent. copper.

About 1 mile S. from the Ediacara main workings a large amount of work has been done in a copper-bearing formation, and one shaft sunk to a depth of 12ft., the ore-bearing material consisting chiefly of soft decomposed argillaceous sandstone, with bunches and nodules of copper carbonates, chiefly malachite, through the matrix. A sample taken from the deepest part gave 24.6 per cent. copper and 12dwts. of silver per ton. The formation is ill-defined, and the richest ore occurs in bunches with poor material between.

Ediacara Main Workings.—A sample taken from a small parcel of rich ore on surface (obtained from the old underlie shaft) gave 30.1 per cent. lead, 26.3 per cent. copper, and 2,760ozs. silver per ton; and a sample taken from No. 2 parcel gave 17.0 per cent. copper and 93ozs. 8dwts. silver per ton.

There are also from 30 tons to 40 tons of ore on surface obtained from the old South mine. A picked sample taken from the dump gave 47.8 per cent. lead, 24ozs. 4dwts. silver, and 1.9 per cent. copper. A bulk sample taken gave 25.1 per cent. lead, 3ozs. 16dwts. silver per ton.

The developments on this property are very promising, and the various formations disclosed at different points on the blocks are well worth testing at greater depth. (7-4-13.)

THE BELTANA RAPID ORE TREATMENT MINE (*vide* Reviews Nos. 9, 10, 14, 15, and 16).—Driving and crosscutting in the lode formation at the 62ft. level main shaft is in progress. The E. crosscut is in a total distance of 18ft. from the shaft. The lode material disclosed for that distance consists of soft argillaceous sandstone containing small bunches and nodules of malachite. A bulk sample taken of the ore-bearing material in the face of the crosscut gave 1.4 per cent. copper.

At a point 14ft. from the shaft, in the crosscut, a start has been made to drive N. in the ore body. The drive is in a distance of 5ft., and at the face better ore is showing, a sample giving 2·9 per cent. copper.

The crosscut W. from the shaft at the 62ft. level is in a total distance of 20ft. The material passed through consists chiefly of decomposed argillaceous sandstone with stains of copper carbonates in places. A sample from the ore dump on surface gave 2·8 per cent. copper. A fair quantity of the same class of ore has been treated by the small rapid treatment plant on the mine, and fairly high-grade concentrates obtained. (7-4-13.)

MINERAL CLAIM No. 9493.—Situated $1\frac{1}{2}$ miles from Leigh's Creek Railway Station.

Intermittent prospecting work has been carried on for a number of years on the property, and a large open cut has been made on the S. side of the hill exposing a lode formation of considerable width, with no defined walls, bearing E. and W. and consisting of quartzite, sandstone, quartz, and silicious iron veins, with several seams of rich copper ore, chiefly malachite and copper glance, varying in thickness and traversing the formation in various directions, and judging from the amount of work done at this point on the property large quantities of high-grade ore must have been obtained from the workings in times past.

At the N. end of the open cut workings a vertical shaft has recently been sunk to a depth of 40ft., and several seams of good ore were cut in it. A sample taken from a dump of 15cwts. of ore on surface gave 35·0 per cent. copper, and a sample taken from the outcrop of the formation at a point 5 chains E. from the shaft gave 3·7 per cent. copper.

The prospects of the formation in the present workings are very encouraging, and the vertical shaft should be continued down to prove it at greater depth. (12-4-13.)

THE QUEEN MARY GOLD MINE.—Situated on section 97, hundred of Parnaroo, about 10 miles S.E. from Oodlawirra.

There are two parallel quartz reefs, 20ft. apart, traversing the property, the outcrops are fairly prominent and can be traced for a considerable distance, bearing N. and S. with a slight underlie to the W.

The workings are on gradually rising ground 100ft. above the Parnaroo Plains, and consist of an underlie shaft sunk in No. 1 lode to a depth of 30ft. The formation disclosed in the shaft is ferruginous quartz, schist, and ironstone for a width of 2ft. 6in., carrying gold. The largest portion of the gold appears to occur in the iron veins. The formation is of a hard nature, between well-defined walls, and has every appearance of continuing down to a great depth. A sample taken for full width of lode in the bottom of shaft gave 1dwt. of gold per ton; one from the iron vein 4in. wide gave 8dwts. gold per ton; and one taken from a dump of 3 tons of ore on surface gave 2dwts. of gold per ton.

No work has been done on No. 2 lode, but the outcrop is well-defined and fully 3ft. wide of schist, with quartz and iron veins through the matrix. A sample taken for the full width of the outcrop gave 2dwts. gold per ton, and one from an iron vein 3in. wide gave 5dwts. of gold per ton.

A parcel of 11 tons of ore obtained a few years ago from the sinking of the underlie shaft was treated, and gave a total return of 3ozs. 7dwts. of gold.

Although only a limited amount of work has, so far, been done on the property, the amount of ore treated and samples taken from different parts of the mine show that the lodes are both gold-bearing, and to further prove and determine the value of the ore at greater depth the best and cheapest plan would be to continue down the present shaft to a depth of 100ft. and put in a crosscut to No. 2 lode, then drives could be carried in on the course of the two formations, and the material broken could be hauled up the one shaft. (23-4-13.)

ONLY-A-DREAM GOLD MINE.—Situated between section 61E and 61W, in the hundred of Hardy, 18 miles E. from Ucolta Railway Station.

The main workings are situated near the top of a range 340ft. above the Parnaroo plains, and consist of several prospecting holes, 1ft. to 3ft. deep and one underlie shaft.

There are two small parallel quartz reefs exposed in the workings, bearing E. and W. with a slight angle off the vertical to the N. Both veins are true fissures and about 18ft. apart.

An underlie shaft has recently been sunk in No. 1 reef to a depth of 33ft. The ore body exposed in the shaft, from surface to bottom, consists chiefly of ferruginous quartz, ironstone, and iron pyrites carrying gold. The gold appears to occur in shoots dipping E. Six tons 7cwts. of the ore obtained in sinking the shaft was sent to the Petersburg Cyanide Works, and gave an average return by battery treatment of 8dwts. 18grs. gold per ton, and the tailings gave an assay value of 1dwt. 4½grs. of gold per ton.

The bottom of the shaft apparently is now through the first shoot of gold, as the three samples taken from the bottom gave no values. The ore body in the bottom of the shaft is well-defined, averaging 9in. wide, and has every appearance of continuing down to a great depth, and will probably contain other shoots of good ore. So far the development on the property and the returns obtained of ore treated from the present limited workings fully justify deeper sinking to further prove this promising vein of ore at greater depth.

In several shallow holes, a distance of about 18ft. N. from the underlie shaft, what appears to be the cap of No. 2 reef is showing about 12in. below the surface soil. The quartz vein disclosed in the hole is from 2in. to 4in. wide and, as shown by the sample taken, it contains no value at that point.

EASTERN CLAIM.—Adjoining the Only-a-Dream Mine.

A small amount of prospecting work has been done on this property. A hole 10ft. long, 3ft. wide, by 6ft. deep has been sunk, exposing two nice veins of ferruginous quartz, each 3in. wide and 3ft. apart, bearing E. and W., dip N. The veins are well-defined and may form into one ore body at depth. Samples were taken from each vein, but on assay gave no values, showing that the veins are poor at the present point operated on.

The property is worth being further prospected by extending trenches N. and S. to locate the position of the main lode operated on in the adjoining block, which appears likely to traverse the property. (23-4-13.)

RADIUM HILL MINE (*vide* Record, page 361, and Reviews Nos. 10, 11, 12, 13, 14, 15, 16, 17, and Bulletin *re* Radio-active ores, issued 21-10-11).—Near Olary.

A large amount of good development work has been done at different points on the property. Five underlie shafts have been sunk to various depths of from 70ft. to 100ft., and by driving and stoping in the lode formation considerable quantities of the lode material have been extracted from the various workings, crushed and concentrated by the magnetic separator on the mine, and the various grades of concentrates obtained, amounting to 10 tons per week, have been forwarded to the Sydney works for further treatment.

Driving and stoping is in progress at the 25ft. level in No. 2 shaft; the S.W. drive is in a total distance of 31ft.; the formation disclosed in the workings is from 2ft. to 4ft. wide of schist and iron veins, with incrustations of carnotite through the matrix.

The drive N.E. opposite the last one has been extended in the ore body a distance of 30ft., and at that point in the drive a small fault in the country occurs, bearing E. and W. and dipping S. at an angle of 45°. The fault apparently makes a clean break in the formation of several feet to the E., and on the N. side of the break

(or displacement) two underlie shafts have been sunk in fairly good ore to a depth of 70ft. and 100ft. respectively, thus proving that the formation has not been disturbed to any great extent by the fault, and that the main ore body continues to extend in a N.E. direction.

The plant on the mine consists of rock-breaker, rolls, magnetic separators, one petrol and one oil engine, all being housed in with strongly constructed wood and iron buildings, and everything appears in good order for carrying on the work of crushing and concentrating the ore. (21-5-13.)

SOUTH AUSTRALIAN RADIUM PROPRIETARY MINE.—Sited N.E. of and adjoining the N.E. boundary of the Radium Hill Mine. The property comprises thirteen (13) 40-acre leases, and at different points on the blocks a large amount of good prospecting work has been done by shaft-sinking to depths varying from 30ft. to 100ft.

No. 1 shaft, the deepest, is down a total depth of 100ft. At 12ft. a lode formation was intersected bearing N. E. and S.W., and going down almost vertically. At the 50ft. level the shaft has been covered over, and driving both ways in the formation is now in progress. N.E. drive is in a total distance of 40ft., and the drive S.W. 60ft. The formation disclosed in the drives is fairly defined, varying in width from 2ft. to 4ft., and consists mainly of biotite schist, ilmenite with rutile and splashes of carnotite. N.W. from No. 1 shaft sinking to depths of 30ft. has been done in two separate formations of biotite schist, running parallel with No. 1 formation and about 230ft. to 250ft. apart.

Along the line of strike for a length of from 60 chains to 70 chains a number of prospecting pits have been sunk at different points to depths of from 10ft. to 40ft. The material exposed in the various dumps consists chiefly of biotite schist containing nodules of iron, thus proving that the formations continue for a considerable distance in a N.E. direction.

Four samples of ore taken from different parts of the workings gave, on analysis, the following results:—

- No. 1. Ilmenite with rutile and rare earths, carnotite, splashes and biotite schist, 34.0 per cent., titanium di-oxide, radio-activity equivalent to 0.42 per cent. uranium oxide.
- No. 2. Schist, radio-activity equivalent to 0.03 per cent. uranium oxide.
- No. 3. Ilmenite and biotite schist, radio-activity equivalent to 0.06 per cent. uranium oxide.
- No. 4. Biotite schist, granite, and ilmenite, radio-activity equivalent to 0.05 per cent. uranium oxide.

The prospects so far on this property are of a very encouraging nature, and tend to show that uranium ores extend over a considerable area in this district. (23-5-13)

THE RARE METALS PROPRIETARY MINE.—Sited 3 miles N. from the Radium Hill Mine.

The main shaft on the property has recently been continued down to a depth of 20ft., and from the bottom a drive on the course of the formation has been carried in N.W. for a distance of 24ft. The formation disclosed consists mainly of biotite schist and iron, 2ft. to 3ft. wide, containing uranium oxide. Two samples taken, one from the drive and one from the ore dump, gave on analysis the following results:—

- No. 1. From face of N.W. drive. Biotite schist and ilmenite. Radio-activity equivalent to 0.10 per cent. uranium oxide.
- No. 2. Ore dump. Ilmenite with rutile and rare earths, and biotite schist, 14.0 per cent. titanium di-oxide. Radio-activity equivalent to 0.15 per cent. uranium oxide.

The prospects of the lode formation at present level are promising, and justify exploration work done to a greater depth. (23-5-13.)

THE KING'S BLUFF GOLD MINE (*vide* Record page 223, and Reviews Nos. 8, 9, 10, 13, 14, 15, and 16).

The main vertical shaft on the property has recently been equipped with winding winch, vertical boiler, head-gear, and runners from surface to near bottom, and since the erection of this plant a fair amount of sinking has been done, and the shaft is now down a total depth of 223ft. (or within 40ft. of the estimated depth that the ore body operated on in the underlie shaft should be intersected). The country passed through in the last feet of sinking consists of grey sandstone of a porous nature.

The quantity of water making in the shaft at present depth is fairly heavy owing probably to the large quantity of accumulated water in the underlie workings coming in through the joints and porous rocks; when that has been drained out the water in the shaft should greatly decrease, and the sinking will be less expensive. Work at the mine has been suspended for a time, but the manager is in charge, and he anticipates that shaft-sinking will soon be resumed. (24-5-13.)

THE HOMEWARD BOUND (WANDA) GOLD MINE (*vide* Record, page 246, and Reviews Nos. 9, 11, 14, and 15).—Near Mannahill.

The sinking of an underlie shaft in the lode is in progress at a point on the block about 200yds. W. from the battery plant; this has now reached a depth of 30ft. from the surface, and the lode formation disclosed consists chiefly of ferruginous calcite 18in. wide, containing gold and bismuth. A parcel of about 5 tons of the ore extracted from the shaft has recently been forwarded to the Petersburg Cyanide Works, and it is anticipated will give fairly high returns.

The prospects of this mine are very good. The lode formation disclosed in the various underlie shafts along the line of strike is well-defined, varying in width from 10in. to 18in. in thickness and containing in places rich shoots associated with bismuth, which are likely to continue down to a great depth. (25-5-13.)

NEW MILO GOLD MINE, Wadnaminga (*vide* Record, page 322, and Reviews Nos. 10, 11, 14, and 15).—In the main underlie shaft at 370ft. level driving and stoping are in progress, and the ore obtained from the workings is of fairly good quality.

The W. drive in the lode is now in a total distance of 210ft. from the shaft. A well-defined lode formation is disclosed in the drive, consisting chiefly of ferruginous quartz and ironstone veins, with patches of iron pyrites, 18in. to 30in. wide, carrying gold. Two parcels of ore extracted from these workings were recently treated by the Virginia battery.

No. 1 parcel amounting to 14 tons gave a return from battery treatment of 12ozs. 15dwts. of gold and tailings assayed 14dwts.

No. 2 parcel of 29 tons gave a return by battery treatment of 17ozs. of gold, tailings from this parcel have not yet been assayed.

The future prospects of this property are very promising, and now that a treatment plant has been erected on the adjoining block where ore from the other mines on the field can be treated, a great saving in carting will be made, and the mines will have much better chances to become payable.

Three samples taken from different parts of the workings in the underlie shaft gave the following results:—

No. 1 sample from face of W. drive, gave 1oz. 8dwts. of gold per ton.

No. 2 sample, from S.W. side of drive, 20ft. back from face, gave 3ozs. 17dwts. of gold per ton.

No. 3, from N.E. side of drive, 30ft. back from face, gave 1oz. 4dwts. of gold per ton.—(20-5-13.)

THE GOLDEN RECORD MINE, Wadnaminga (*vide* Record page 321, and Reviews Nos. 14 and 15).—Work is in progress at present at 70ft. level in the underlie shaft: a stope has been carried in E. from the shaft a distance of 6ft. The vein of ore

disclosed in the workings consists of ferruginous quartz, iron pyrites, and decomposed slate, 9in. to 15in. wide, containing patches of rich gold. Some fine gold specimens stone has recently been obtained from the present workings, and about 21ozs. of gold, worth £3 17s. 10½d. per ounce, were extracted by hand-crushing.

The lode formation in the present prospecting shaft and in the various old workings is well-defined, with every indication of continuing down, but to further develop the ore body it will be necessary to put down a new shaft, the present one being much too small, and not suitable for hauling purposes. The prospects of the lode in the various workings are fairly promising and warrant the sinking of the new vertical shaft at a point a few chains S. from present underlie to intersect the formation at a reasonable depth, then the main drives on the course of the lode could be carried in and the mine opened out in a systematic manner.

The ore in the shaft at present is of low grade, and apparently the sinking has passed through the rich shoot of stone. A sample taken from the bottom gave no value. Samples taken from E. and W. side of the shaft, one gave 3dwts. of gold per ton and one nil. A sample taken from a small dump of coarse and fine lode material on surface gave 8ozs. 4dwts. of gold per ton. This last sample shows that the shoot of ore passed through in sinking was fairly rich, and is well worth testing at greater depth. (20-5-13.)

THE VICTORIA TOWER GOLD MINE (*vide* Record page 320), Wadnaminga.—A considerable amount of work was done on the property some few years ago by a Victorian company, but little or nothing of late years.

The main underlie shaft sunk in the lode is down a total depth of 445ft., but the lower portion of the mine up to 330ft. level is full of water and could not be examined. At the 270ft. level a drive in the lode has been extended W. for a distance of 300ft., and has been connected with the air shaft.

The lode formation disclosed in the various workings is exceedingly well-defined, bearing E. and W., dipping S., and consisting of solid quartz with a fair amount of pyrites, 3ft. 6in. to 4ft. wide, with ferruginous indicator veins, 1in. to 3in. wide, intersecting the main formation at several points in the workings.

Comparatively very little stoping has been done in the mine except in the vicinity of the indicators, where the main lode, as shown by prior records of the mine, was fairly rich and large quantities of specimen gold-bearing quartz were obtained from the various workings.

Along the line of strike several holes have been sunk to shallow depths exposing the main lode formation at various points for a length of fully 900ft., and in all these it is wide and persistent with every indication of containing rich shoots of gold in places, as shown by samples taken at different levels.

- No. 1. From side of shaft, at 280ft. level, gave no value.
- No. 2. From side of shaft, 270ft. level, 1dwt. gold per ton.
- No. 3. From side W. drive, 270ft. level, 4ozs. 1dwt. gold per ton.
- No. 4. From 225ft. W. from shaft, 270ft. level, trace.
- No. 5. From E. of air shaft, 100ft. level, 3ozs. 10dwts. gold per ton.

The mine has recently been taken up by a party of men now on the field, and they anticipate to shortly have mining operations resumed so as to further prove and develop the ore body. (21-5-13.)

THE VIRGINIA GOLD MINE, Wadnaminga (*vide* Record pages 323, and Reviews Nos. 14, 15, 16, and 17).—A large amount of development work has recently been done on this property and a new crushing plant erected, comprising five-head stamper battery, 11lwts. each, with 28 H.P. suction gas engine to drive same. All are housed in with strong wood and iron buildings.

A short distance N. from the plant a vertical shaft, 6ft. x 3ft. in the clear, has been sunk, and the main lode was intersected at 60ft. A tramline on trestles 10ft. high has been made from the landing stage to the battery ore bin. The shaft is equipped with duplex pump, driven by 6 h.p. engine, the water making is about 1,000 galls. per hour, which is pumped up from the shaft to the storage tanks for use in crushing and other purposes.

At the bottom of the vertical shaft drives on the course of the lode have been started, and as the drives are extended E. and W. large blocks of new ground will be made available for stoping.

In the W. drive off No. 3 underlie shaft stoping is in progress, the lode formation disclosed in the various workings consists of ferruginous quartz, iron veins, and iron pyrites, 18in. to 24in. wide, carrying gold. The largest portion of the gold appears to occur in a very fine state in the iron veins and iron pyrites.

About 300 tons of ore have been treated by the new plant, 250 tons of which gave an average return by battery treatment of 6dwts. 15grs. of gold per ton, and the other 50 tons of lode material taken from surface dump on the Victoria Tower Mine gave an average by battery of $4\frac{1}{2}$ dwts. of gold per ton. The tailings from the two parcels treated contain fair values and will be further treated by cyanide. As it has now been decided to install a cyanide plant on the mine to treat the accumulated stock of tailings and those made in future operations the prospects of this mine appear very promising. Nine samples of the lode material taken from different parts of the workings gave on assay the following values:—

- No. 1. Underlie shaft, 100ft. level, trace
- No. 2. Underlie shaft, 80ft. level, 1dwts. gold per ton.
- No. 3. Underlie shaft, 130ft. level, 2ozs. 12dwts. gold per ton.
- No. 4. Stope W. drive, nil.
- No. 5. E. drive, 10dwts. gold per ton.
- No. 6. New vertical shaft, 50ft. level, 8ozs. 17dwts. gold per ton.
- No. 7. Near new vertical shaft, 55ft. level, 5ozs. 4dwts. gold per ton.
- No. 8. E. of No. 2 vertical shaft, 45ft. level, 13dwts. gold per ton.
- No. 9. Pyrites ore, 60ft. level, 2ozs. 8dwts. gold per ton. (21-5-13.)

THE PERSEVERANCE SILVER-LEAD MINE, formerly known as Winkler's (*vide* Record, page 194, and Reviews Nos. 9, 10, and 14).—Situating two miles S.W. from Lux Mine.

The vertical shaft on the property is down a total depth of 25ft. At that level the main lode was intersected. A fair amount of work was carried on at one time in this formation by underlie shaft workings and several hundred tons of high-grade silver-lead ore were extracted from the shallow workings and marketed.

Driving on the course of the lode from the bottom of the shaft is now in progress. The E. drive is in a total distance of 43ft. and the S.W. drive 8ft. The formation is composed of soft decomposed ferruginous clayslate, 12in. to 24in. wide, with seams and nodules of galena through the matrix.

A sample taken of the galena ore obtained from the drive assayed 24ozs. 12dwts. of silver and 56.0 per cent. lead. A sample taken from an iron vein gave no value.

The formation is fairly defined in the various workings, and should be tested at greater depth in the settled country. (23-5-13.)

BOOMERANG GOLD MINE (*vide* Record, page 210, and Review No. 15).—Situating about 9 miles N.E. from Mannahill.

A fair amount of mining work has been done at one time on this property, but comparatively very little for some years past, and the water in the shaft has risen to within 30ft. of the surface.

The lode formation exposed in the old shallow pits is fairly defined, consisting of quartz, iron, and iron pyrites carrying gold. A sample taken from a dump of lode material on surface, thick with pyrites, gave 17dwts. of gold per ton.

WESTWARD HO GOLD MINE, near Mannahill (*vide* Record, pages 244, 247, and Review No. 15).—No work carried on at the mine at time of my visit, and the water is up to its original level in the workings. (24-5-13.)

THE TAVEN-CORE GOLD MINE, formerly Lykke Viking, Teetulpa (*vide* Record, page 267, and Reviews Nos. 11, 14, and 15).—This property, with all mining tools, three-head stamper battery (rapid crushing), oil engine, and pump worked by a windmill, was recently acquired by a Broken Hill syndicate.

Vigorous work is now in progress at different parts of the property. Men are employed overhauling and repairing the machinery and erecting new concentrating tables for saving the pyritic ore, a large amount of which occurs in various reefs, and is found to contain the major portion of the gold contents of the lodes.

There are a large number of auriferous lodes and veins traversing the block. The Ironclad belt of reefs bearing N. and S. with others E. and W. all are well-defined, consisting of ferruginous quartz, iron veins, and iron pyrites, varying in width from 3in. up to 3ft. wide, carrying gold.

The work of sampling and thoroughly testing the various lodes is in hand, with a view to subsequently selecting a suitable site for a main working shaft to open out the mine and carry on mining work on a fairly extensive scale.

A short distance W. from the Ironclad lode a trench has recently been made in a N. and S. direction for a length of 100ft. and to a depth of 5ft., in which are exposed three parallel leaders 18in. apart and 2in. to 6in. wide. These are well-defined and consist of ferruginous quartz, iron stone veins, and iron pyrites carrying gold, as shown by the three samples taken.

No. 1 sample, E. veins 4ft. deep, gave trace of gold.

No. 2 sample, middle vein 4ft. deep, gave 2ozs. 18dwts. per ton.

No. 3 sample, W. vein 4ft. deep, gave 1oz. 13dwts. gold per ton.

No. 4 sample, Red shaft, gave 2dwts. gold per ton.

No. 5 sample, No. 1 shaft, 12ft. deep, gave trace gold per ton.

No. 6 sample, No. 1 shaft, 20ft. deep, gave 1oz. 5dwts. gold per ton.

The lode formation disclosed in No. 1 shaft and Red shaft are strongly defined ore bodies, 15in. to 24in. wide, of very promising looking quartz and ironstone likely to contain rich shoots of gold in places. (25-5-13.)

THE ST. ELMO MINE (CARN BREA), *vide* Record page 39).—Situated in the hundred of Bright, section 73.

A large amount of prospecting work has recently been done on block No. 2472, and in various shallow workings low-grade copper-bearing formations are exposed strike N. and S., dip W. at an angle of 45°. the formations consist chiefly of quartz, dolomite, and decomposed clay slate, with stains and small specks of malachite and azurite for a width of 2ft. to 4ft.

On the E. side of the hill, a short distance above the gully at a point between No. 1 and No. 2 formations, a vertical shaft has recently been sunk to a depth of 40ft. From the bottom of the shaft a crosscut has been extended W. 25ft., in which

three quartz leaders, 6in. to 12in. wide, containing a little copper carbonate, were intersected. Samples taken from the three veins gave on assay an average of 1.0 per cent. copper, and a sample from the face of the drive gave 0.1 per cent. copper; there was no trace of gold in any of the samples. This shows that the veins are of comparatively very little value at present level, but may improve as greater depth is attained.

About 15ft. N. from the vertical shaft an underlie has been sunk to a depth of 10ft. in what appears to be the outcrop of the middle lode. The formation disclosed consists of decomposed clayslates, dolomite, with veins of quartz and ironstone 3ft. to 4ft. wide. Of the four samples taken of the lode material in the shaft two gave no value and two gave 0.2 per cent. copper.

At a point 20ft. S. from the main shaft an open cut has been made in the outcrop of No. 1 lode to a depth of 8ft. A fairly defined formation is exposed in these workings of quartz and dolomite, 4ft. wide, with stains and small seams of malachite and azurite through the matrix. Three samples taken from different parts of the hole gave:—No. 1, 1.5 per cent. copper; No. 2, 4.5 per cent. copper; and No. 3, 1.8 per cent. copper; and sample taken from the outcrop of the lode five chains farther S. gave 4.5 per cent. copper, thus showing that it is quite possible that a good shoot of ore will be found a short distance S. from present workings.

At a point about 12 chains to 15 chains S. from the new shaft a fair amount of work appears to have been done many years ago. Most of the old workings are now in a bad state and could not be inspected. A sample taken of copper-bearing veins at the 35ft. level in one of the old shafts gave 1.6 per cent. copper.

So far very little work has been done in the W. lode, which on the surface shows a strong body of quartz 3ft. to 4ft. wide. Two samples of the lode material were taken from the outcrop—No. 1, nil; No. 2 gave 0.9 per cent. copper.

The prospects so far on this property are discouraging. The lodes are of low grade in copper, and the 15 samples of lode material taken and assayed did not show a trace of gold value. (3-6-13.)

